APPENDIX C

Air Quality Emission Calculations and Assessment

Emission Calculations

Table 1
Construction Emissions Summary
Total Annual Criteria Pollutant Emissions in tons by Construction Phase

	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Phase	**VOC (ton/year)**		**CO (ton/year)**		**NOX (ton/year)**		**SOX (ton/year)**		**PM10 (ton/year)**		**PM2.5 (ton/year)**	
Cross Valley Loop Construction												
Survey	0.00		0.03		0.00		0.00		0.05		0.01	
Laydown Yard	0.01		0.05		0.12		0.00		0.01		0.01	
ROW Clearing	0.10		0.39		0.96		0.00		1.62		0.36	
Roads and Landing Work	0.05		0.19		0.49		0.00		1.10		0.24	
Guard Structure Installation	0.04		0.13		0.32		0.00		0.10		0.03	
Install Tower and Pole Foundations	0.12		0.51		1.23		0.00		1.20		0.28	
Tower and Pole Haul	0.01		0.03		0.08		0.00		0.19		0.04	
Tower and Pole Assembly	0.21		0.88		1.54		0.00		0.86		0.26	
Tower and Pole Erection	0.12	0.04	0.48	0.16	0.86	0.29	0.00	0.00	0.56	0.52	0.16	0.12
Install Conductor & OPGW	0.21	0.12	0.87	0.48	2.11	1.17	0.00	0.00	1.21	0.67	0.31	0.17
Guard Structure Removal		0.01		0.04		0.08		0.00		0.09		0.02
Restoration	0.02	0.04	0.09	0.13	0.23	0.35	0.00	0.00	0.34	0.51	0.08	0.12
Helicopter Use	0.09	0.09	0.34	0.34	1.13	1.13	0.00	0.00	0.11	0.11	0.05	0.05
Total Phase Emissions	**0.99**	**0.29**	**4.00**	**1.16**	**9.09**	**3.02**	**0.01**	**0.00**	**7.33**	**1.90**	**1.82**	**0.48**

Notes:
VOC = volatile organic compounds
CO = carbon monoxide
NOX = nitrogen oxides
SOX = sulfur oxides
PM10 = suspended particulate matter measuring less than 10 microns
PM2.5 = suspended particulate matter measuring less than 2.5 microns
Blank cells indicates that emissions would not occur due to the listed activity in that year.

Table 2
Construction Emissions Summary
Total Greenhouse Gas Emissions by Construction Phase

	2013	2014
Phase	**CO2e (MT)**	
Cross Valley Loop Construction		
Survey	93.08	--
Laydown Yard	14.47	--
ROW Clearing	120.38	--
Roads and Landing Work	64.15	--
Guard Structure Installation	46.68	--
Install Tower and Pole Foundations	218.97	--
Tower and Pole Haul	10.12	--
Tower and Pole Assembly	157.12	--
Tower and Pole Erection	92.34	30.78
Install Conductor & OPGW	281.24	156.24
Guard Structure Removal	--	9.27
Restoration	28.26	42.39
Helicopter Use	185.66	185.66
TOTAL	**1,312.47**	**424.34**

Table 3
Construction Emissions
Survey - 2013

Emissions Summary

Source	VOC (lb/day)	CO (lb/day)	NOX (lb/day)	SOX (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2e (MT)
Construction Equipment Exhaust							
Onsite Motor Vehicle Exhaust							
Onsite Motor Vehicle Fugitive PM	--	--	--	--	1.96	0.41	
Earthwork Fugitive PM	--	--	--	--			
Onsite Total					**1.96**	**0.41**	
Offsite Motor Vehicle Exhaust	0.05	1.50	0.20	0.00	0.02	0.02	93.1
Offsite Motor Vehicle Fugitive PM	--	--	--	--	0.20	0.04	
Offsite Total	**0.05**	**1.50**	**0.20**	**0.00**	**0.22**	**0.06**	**93.1**
Total	**0.05**	**1.50**	**0.20**	**0.00**	**2.18**	**0.47**	**93.1**
Total Phase (lb/Phase)	**2.25**	**67.50**	**9.00**	**0.09**	**98.31**	**21.10**	
Total Phase (ton/Phase)	**0.00**	**0.03**	**0.00**	**0.00**	**0.05**	**0.01**	

# of working days 45 days

Construction Equipment Summary

Equipment	Horse-power	Number	Days Used	Hours Used/ Day
None				

Construction Equipment Exhaust Emission Factors

Equipment	Horse-power	VOC (lb/hr)[a]	CO (lb/hr)[a]	NOX (lb/hr)[a]	SOX (lb/hr)[a]	PM10 (lb/hr)[a]	PM2.5 (lb/hr)[b]	CO2 (lb/hr)[a]	CH4 (lb/hr)[a]	Category
None										

[a] From Table 20

[b] Diesel PM2.5 emission factor [lb/hr] = PM10 emission factor [lb/hr] x PM2.5 fraction of PM10

PM2.5 Fraction= 0.920

From Appendix A, Final–Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds, SCAQMD, October 2006, http://www.aqmd.gov/ceqa/handbook/PM2_5/PM2_5.html

Construction Equipment Daily Criteria Pollutant Exhaust Emission

Equipment	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
None						
Total						

[a] Emissions [lb/day] = number x hours/day x emission factor [lb/hr]

Table 3
Construction Emissions
Survey - 2013

Construction Equipment Total Greenhouse Gas Emissions

Equipment	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
None			
Total			

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x hours/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Usage

Vehicle	Number	Days Used	Hours Used/ Day	Miles/ Day/ Veh.
Offsite				
1/2 Ton Pick-Up Truck, 4X4	2	45		50
Worker Commute	4	45		25

Motor Vehicle Exhaust Emission Factors

Vehicle	Category	VOC (lb/mi)[a]	CO (lb/mi)[a]	NOX (lb/mi)[a]	SOX (lb/mi)[a]	PM10 (lb/mi)[a]	PM2.5 (lb/mi)[a]	CO2 (lb/mi)[a]	CH4 (lb/mi)[a]
Offsite									
1/2 Ton Pick-Up Truck, 4X4	Passenger	2.00E-04	8.00E-03	1.00E-03	1.00E-05	1.10E-04	1.02E-04	9.30E-01	1.07E+00
Worker Commute	Passenger	3.00E-04	7.00E-03	1.00E-03	1.00E-05	9.00E-05	8.37E-05	9.30E-01	1.02E+00

[a] From Table 20

Motor Vehicle Daily Criteria Pollutant Exhaust Emissions

Vehicle	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
Offsite						
1/2 Ton Pick-Up Truck, 4X4	0.02	0.80	0.10	0.00	0.01	0.01
Worker Commute	0.03	0.70	0.10	0.00	0.01	0.01
Offsite Total	**0.05**	**1.50**	**0.20**	**0.00**	**0.02**	**0.02**
Total	**0.05**	**1.50**	**0.20**	**0.00**	**0.02**	**0.02**

[a] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Table 3
Construction Emissions
Survey - 2013

Motor Vehicle Total Greenhouse Gas Emissions

Vehicle	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
Offsite			
1/2 Ton Pick-Up Truck, 4X4	1.9	2.2	47.6
Worker Commute	1.9	2.1	45.4
Offsite Total	**3.8**	**4.3**	**93.1**
Total	**3.8**	**4.3**	**93.1**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x miles/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Fugitive Particulate Matter Emissions

Vehicle	Number	Road Type	Miles/ Day/ Vehicle[c]	PM10 Emission Factor (lb/mi)[a]	PM2.5 Emission Factor (lb/mi)[a]	PM10 Emissions (lb/day)[b]	PM2.5 Emissions (lb/day)[b]
Onsite							
1/2 Ton Pick-Up Truck, 4X4	2	Unpaved	5	0.140	0.030	1.40	0.30
Worker Commute	4	Unpaved	1	0.140	0.030	0.56	0.12
Onsite Total						**1.96**	**0.41**
Offsite							
1/2 Ton Pick-Up Truck, 4X4	2	Paved	45	0.0011	0.0002	0.10	0.02
Worker Commute	4	Paved	24	0.0011	0.0002	0.11	0.02
Offsite Total						**0.20**	**0.04**
Total						**2.16**	**0.45**

[a] From Table 20

[b] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Table 4
Construction Emissions
Laydown Yard - 2013

Emissions Summary

Source	VOC (lb/day)	CO (lb/day)	NOX (lb/day)	SOX (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2e (MT)
Construction Equipment Exhaust	0.74	2.24	7.47	0.01	0.25	0.23	12.2
Onsite Motor Vehicle Exhaust							
Onsite Motor Vehicle Fugitive PM	--	--	--	--	0.42	0.09	
Earthwork Fugitive PM	--	--	--	--			
Onsite Total	**0.74**	**2.24**	**7.47**	**0.01**	**0.67**	**0.32**	**12.2**
Offsite Motor Vehicle Exhaust	0.05	0.79	0.43	0.00	0.02	0.02	2.2
Offsite Motor Vehicle Fugitive PM	--	--	--	--	0.18	0.03	
Offsite Total	**0.05**	**0.79**	**0.43**	**0.00**	**0.20**	**0.05**	**2.2**
Total	**0.79**	**3.03**	**7.90**	**0.01**	**0.88**	**0.37**	**14.5**
Total Phase (lb/Phase)	**23.61**	**90.81**	**236.94**	**0.34**	**26.28**	**11.18**	
Total Phase (ton/Phase)	**0.01**	**0.05**	**0.12**	**0.00**	**0.01**	**0.01**	

# of working days 30 days

Construction Equipment Summary

Equipment	Horse-power	Number	Days Used	Hours Used/ Day
30 Ton Crane Truck	300	1	30	2
Rough Terrain Forklift	200	1	30	5

Construction Equipment Exhaust Emission Factors

Equipment	Horse-power	VOC (lb/hr)[a]	CO (lb/hr)[a]	NOX (lb/hr)[a]	SOX (lb/hr)[a]	PM10 (lb/hr)[a]	PM2.5 (lb/hr)[b]	CO2 (lb/hr)[a]	CH4 (lb/hr)[a]	Category
30 Ton Crane Truck	300	0.098	0.341	0.919	0.001	0.034	0.031	107.964	0.008	Cranes
10,000 lb Rough Terrain Fork Lift	200	0.108	0.311	1.126	0.002	0.037	0.034	136.515	0.010	Forklifts

[a] From Table 20

[b] Diesel PM2.5 emission factor [lb/hr] = PM10 emission factor [lb/hr] x PM2.5 fraction of PM10

PM2.5 Fraction= 0.920

From Appendix A, Final–Methodology to Calculate Particulate Matter (PM) 2.5
and PM 2.5 Significance Thresholds, SCAQMD, October 2006,
http://www.aqmd.gov/ceqa/handbook/PM2_5/PM2_5.html

Table 4
Construction Emissions
Laydown Yard - 2013

Construction Equipment Daily Criteria Pollutant Exhaust Emission

Equipment	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
30 Ton Crane Truck	0.20	0.68	1.84	0.00	0.07	0.06
Rough Terrain Forklift	0.54	1.56	5.63	0.01	0.18	0.17
Total	**0.74**	**2.24**	**7.47**	**0.01**	**0.25**	**0.23**

[a] Emissions [lb/day] = number x hours/day x emission factor [lb/hr]

Construction Equipment Total Greenhouse Gas Emissions

Equipment	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
30 Ton Crane Truck	2.9	0.00	2.9
Rough Terrain Forklift	9.3	0.00	9.3
Total	**12.2**	**0.0**	**12.2**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x hours/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Usage

Vehicle	Number	Days Used	Hours Used/ Day	Miles/ Day/ Veh.[a]
Onsite				
1 Ton Crew Cab, 4X4	1	30		
Truck, Semi, Tractor	1	30		
Offsite				
1 Ton Crew Cab, 4X4	1	30		50
Truck, Semi, Tractor	1	30		20
Worker Commute	4	30		25

[a] Onsite travel based on 25% use at 10 mph average speed

Table 4
Construction Emissions
Laydown Yard - 2013

Motor Vehicle Exhaust Emission Factors

Vehicle	Category	VOC (lb/mi)[a]	CO (lb/mi)[a]	NOX (lb/mi)[a]	SOX (lb/mi)[a]	PM10 (lb/mi)[a]	PM2.5 (lb/mi)[b]	CO2 (lb/mi)[a]	CH4 (lb/mi)[a]
Onsite									
1 Ton Crew Cab, 4X4	Delivery	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05
Truck, Semi, Tractor	Delivery	5.00E-04	2.00E-03	9.00E-03	1.00E-05	1.70E-04	1.56E-04	1.16E+00	2.00E-05
Offsite									
1 Ton Crew Cab, 4X4	Delivery	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05
Truck, Semi, Tractor	Delivery	5.00E-04	2.00E-03	9.00E-03	1.00E-05	1.70E-04	1.56E-04	1.16E+00	2.00E-05
Worker Commute	Passenger	3.00E-04	7.00E-03	1.00E-03	1.00E-05	9.00E-05	8.37E-05	1.02E+00	7.00E-05

[a] From Table 20

Motor Vehicle Daily Criteria Pollutant Exhaust Emissions

Vehicle	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
Onsite						
1 Ton Crew Cab, 4X4						
Truck, Semi, Tractor						
Onsite Total						
Offsite						
1 Ton Crew Cab, 4X4	0.01	0.05	0.15	0.00	0.01	0.01
Truck, Semi, Tractor	0.01	0.04	0.18	0.00	0.00	0.00
Worker Commute	0.03	0.70	0.10	0.00	0.01	0.01
Offsite Total	**0.05**	**0.79**	**0.43**	**0.00**	**0.02**	**0.02**
Total	**0.05**	**0.79**	**0.43**	**0.00**	**0.02**	**0.02**

[a] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Table 4
Construction Emissions
Laydown Yard - 2013

Motor Vehicle Total Greenhouse Gas Emissions

Vehicle	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
Onsite			
1 Ton Crew Cab, 4X4			
Truck, Semi, Tractor			
Onsite Total			
Offsite			
1 Ton Crew Cab, 4X4	0.5	0.0	0.5
Truck, Semi, Tractor	0.3	0.0	0.3
Worker Commute	1.4	0.0	1.4
Offsite Total	**2.2**	**0.0**	**2.2**
Total	**2.2**	**0.0**	**2.2**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x miles/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Fugitive Particulate Matter Emissions

Vehicle	Number	Road Type	Miles/ Day/ Vehicle[c]	PM10 Emission Factor (lb/mi)[a]	PM2.5 Emission Factor (lb/mi)[a]	PM10 Emissions (lb/day)[b]	PM2.5 Emissions (lb/day)[b]
Onsite							
1 Ton Crew Cab, 4X4	1	Unpaved	2	0.140	0.030	0.28	0.06
Truck, Semi, Tractor	1	Unpaved	1	0.140	0.030	0.140	0.030
Onsite Total						**0.42**	**0.09**
Offsite							
1 Ton Crew Cab, 4X4	1	Paved	48	0.001	2.00E-04	0.05	0.01
Truck, Semi, Tractor	1	Paved	19	0.001	2.00E-04	0.02	0.00
Worker Commute	4	Paved	25	0.001	2.00E-04	0.11	0.02
Offsite Total						**0.18**	**0.03**
Total						**0.60**	**0.12**

[a] From Table 20

[b] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Table 5
Construction Emissions
ROW Clearing - 2013

Emissions Summary

Source	VOC (lb/day)	CO (lb/day)	NOX (lb/day)	SOX (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2e (MT)
Construction Equipment Exhaust	3.19	11.49	28.81	0.04	1.15	1.06	100.1
Onsite Motor Vehicle Exhaust							
Onsite Motor Vehicle Fugitive PM	--	--	--	--			
Earthwork Fugitive PM	--	--	--	--	30.30	6.30	
Onsite Total	**3.19**	**11.49**	**28.81**	**0.04**	**31.45**	**7.36**	**100.1**
Offsite Motor Vehicle Exhaust	0.22	1.62	3.26	0.01	0.08	0.08	20.3
Offsite Motor Vehicle Fugitive PM	--	--	--	--	22.40	4.72	
Offsite Total	**0.22**	**1.62**	**3.26**	**0.01**	**22.48**	**4.80**	**20.3**
Total	**3.41**	**13.11**	**32.06**	**0.04**	**53.93**	**12.16**	**120.4**
Total Phase (lb/Phase)	**204.34**	**786.42**	**1923.78**	**2.65**	**3235.92**	**729.35**	
Total Phase (ton/Phase)	**0.10**	**0.39**	**0.96**	**0.00**	**1.62**	**0.36**	

# of working days 60 days

Construction Equipment Summary

Equipment	Horse-power	Number	Days Used	Hours Used/ Day
Small Loader	50	1	60	8
Road Grader	350	1	60	6
Track Type Dozer	350	1	60	6
Backhoe/Front Loader	350	1	60	6

Construction Equipment Exhaust Emission Factors

Equipment	Horse-power	VOC (lb/hr)[a]	CO (lb/hr)[a]	NOX (lb/hr)[a]	SOX (lb/hr)[a]	PM10 (lb/hr)[a]	PM2.5 (lb/hr)[b]	CO2 (lb/hr)[a]	CH4 (lb/hr)[a]	Category
Small Loader	50	0.032	0.148	0.205	0.000	0.018	0.017	21.534	0.003	Tractors/Loaders/Backhoes
Road Grader	350	0.136	0.464	1.273	0.002	0.047	0.043	160.495	0.012	Graders
Track Type Dozer	350	0.186	0.714	1.673	0.002	0.066	0.061	181.298	0.017	Crawler Tractors
Backhoe/Front Loader	350	0.167	0.540	1.582	0.003	0.055	0.051	241.181	0.015	Tractors/Loaders/Backhoes

[a] From Table 20

[b] Diesel PM2.5 emission factor [lb/hr] = PM10 emission factor [lb/hr] x PM2.5 fraction of PM10

PM2.5 Fraction= 0.920

From Appendix A, Final–Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds, SCAQMD, October 2006, http://www.aqmd.gov/ceqa/handbook/PM2_5/PM2_5.html

Table 5
Construction Emissions
ROW Clearing - 2013

Construction Equipment Daily Criteria Pollutant Exhaust Emissions

Equipment	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
Small Loader	0.25	1.18	1.64	0.00	0.14	0.13
Road Grader	0.82	2.78	7.64	0.01	0.28	0.26
Track Type Dozer	1.12	4.28	10.04	0.01	0.40	0.36
Backhoe/Front Loader	1.00	3.24	9.49	0.02	0.33	0.30
Total	**3.19**	**11.49**	**28.81**	**0.04**	**1.15**	**1.06**

[a] Emissions [lb/day] = number x hours/day x emission factor [lb/hr]

Construction Equipment Total Greenhouse Gas Emissions

Equipment	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
Small Loader	4.7	0.0	4.7
Road Grader	26.2	0.0	26.3
Track Type Dozer	29.6	0.0	29.7
Backhoe/Front Loader	39.4	0.0	39.4
Total	**99.9**	**0.0**	**100.1**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x hours/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Usage

Vehicle	Number[a]	Days Used	Hours Used/ Day	Miles/ Day/ Veh.
Offsite				
Water Truck	2	60		50
Lowboy Truck/Trailer	1	60		10
1 Ton Crew Cab, 4X4	1	60		50
10 Cubic Yard Dump Truck	2	60		100
Worker Commute	5	60		25

Table 5
Construction Emissions
ROW Clearing - 2013

Motor Vehicle Exhaust Emission Factors

Vehicle	Category	VOC (lb/mi)[a]	CO (lb/mi)[a]	NOX (lb/mi)[a]	SOX (lb/mi)[a]	PM10 (lb/mi)[a]	PM2.5 (lb/mi)[b]	CO2 (lb/mi)[a]	CH4 (lb/mi)[a]
Offsite									
Water Truck	HHDT	5.00E-04	2.00E-03	9.00E-03	1.00E-05	1.70E-04	1.56E-04	1.16E+00	2.00E-05
Lowboy Truck/Trailer	Passenger	2.00E-03	9.00E-03	2.80E-02	4.00E-05	1.10E-03	1.01E-03	4.50E+00	9.00E-05
1 Ton Crew Cab, 4X4	Passenger	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05
10 Cubic Yard Dump Truck	HHDT	5.00E-04	2.00E-03	9.00E-03	1.00E-05	1.70E-04	1.56E-04	1.16E+00	2.00E-05
Worker Commute	Passenger	3.00E-04	7.00E-03	1.00E-03	1.00E-05	9.00E-05	8.37E-05	1.02E+00	7.00E-05

[a] From Table 20

Motor Vehicle Daily Criteria Pollutant Exhaust Emissions

Vehicle	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
Offsite						
Water Truck	0.05	0.20	0.90	0.00	0.02	0.02
Lowboy Truck/Trailer	0.02	0.09	0.28	0.00	0.01	0.01
1 Ton Crew Cab, 4X4	0.01	0.05	0.15	0.00	0.01	0.01
10 Cubic Yard Dump Truck	0.10	0.40	1.80	0.00	0.03	0.03
Worker Commute	0.04	0.88	0.13	0.00	0.01	0.01
Offsite Total	**0.22**	**1.62**	**3.26**	**0.01**	**0.08**	**0.08**
Total	**0.22**	**1.62**	**3.26**	**0.01**	**0.08**	**0.08**

[a] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Motor Vehicle Total Greenhouse Gas Emissions

Vehicle	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
Offsite			
Water Truck	3.2	0.0	3.2
Lowboy Truck/Trailer	1.2	0.0	1.2
1 Ton Crew Cab, 4X4	6.1	0.0	6.1
10 Cubic Yard Dump Truck	6.3	0.0	6.3
Worker Commute	3.5	0.0	3.5
Offsite Total	**20.3**	**0.0**	**20.3**
Total	**20.3**	**0.0**	**20.3**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x miles/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Table 5
Construction Emissions
ROW Clearing - 2013

Motor Vehicle Fugitive Particulate Matter Emissions

Vehicle	Number	Road Type	Miles/ Day/ Vehicle	PM10 Emission Factor (lb/mi)[a]	PM2.5 Emission Factor (lb/mi)[a]	PM10 Emissions (lb/day)[b]	PM2.5 Emissions (lb/day)[b]
Offsite							
Water Truck	2	Unpaved	50	0.140	0.030	14.00	2.95
Lowboy Truck/Trailer	1	Unpaved	5	0.140	0.030	0.70	0.15
1 Ton Crew Cab, 4X4	1	Unpaved	10	0.140	0.030	1.40	0.30
10 Cubic Yard Dump Truck	2	Unpaved	10	0.140	0.030	2.80	0.59
Worker Commute	5	Unpaved	5	0.140	0.030	3.50	0.74
Worker Commute	5	Paved	20	0.001	2.00E-04	0.11	0.02
Offsite Total						**22.40**	**4.72**
Total						**22.40**	**4.72**

[a] From Table 20

[b] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Earthwork Fugitive Particulate Matter Emissions

Activity	Area Disturbed	Units	PM10 Emission Factor[a]	PM2.5 Emission Factor[b]	PM10 (lb/day)[c]	PM2.5 (lb/day)[c]
ROW Clearing	3.03	acre	20.0	4.16	60.60	12.60
Total (Uncontrolled)					60.60	12.60
Total (Controlled)					**30.30**	**6.30**

a. PM10 emissions were estimated based on an emission factor of 20 lbs of PM10 per acre per day

b. PM2.5 emissions were estimated using a SCAQMD PM2.5 fraction 0.208 of PM10 for construction fugitive dust

c. Controlled emissions assume a 50% control from watering

Table 6
Construction Emissions
Roads and Landing Work - 2013

Emissions Summary

Source	VOC (lb/day)	CO (lb/day)	NOX (lb/day)	SOX (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2e (MT)
Construction Equipment Exhaust	3.20	11.01	30.26	0.04	1.11	1.02	51.6
Onsite Motor Vehicle Exhaust							
Onsite Motor Vehicle Fugitive PM	--	--	--	--			
Earthwork Fugitive PM	--	--	--	--	52.10	10.84	
Onsite Total	**3.20**	**11.01**	**30.26**	**0.04**	**53.21**	**11.86**	**51.6**
Offsite Motor Vehicle Exhaust	0.21	1.63	2.73	0.01	0.10	0.09	12.5
Offsite Motor Vehicle Fugitive PM	--	--	--	--	20.30	4.28	
Offsite Total	**0.21**	**1.63**	**2.73**	**0.01**	**20.40**	**4.37**	**12.5**
Total	**3.41**	**12.64**	**32.98**	**0.05**	**73.61**	**16.23**	**64.1**
Total Phase (lb/Phase)	**102.24**	**379.11**	**989.49**	**1.36**	**2208.36**	**486.88**	
Total Phase (ton/Phase)	**0.05**	**0.19**	**0.49**	**0.00**	**1.10**	**0.24**	

# of working days 30 days

Construction Equipment Summary

Equipment	Horse-power	Number	Days Used	Hours Used/ Day
Drum Type Compactor	250	1	30	4
Road Grader	350	1	30	4
Track Type Dozer	350	1	30	6
Backhoe/Front Loader	350	1	30	6

Construction Equipment Exhaust Emission Factors

Equipment	Horse-power	VOC (lb/hr)[a]	CO (lb/hr)[a]	NOX (lb/hr)[a]	SOX (lb/hr)[a]	PM10 (lb/hr)[a]	PM2.5 (lb/hr)[b]	CO2 (lb/hr)[a]	CH4 (lb/hr)[a]	Category
Drum Type Compactor	250	0.135	0.408	1.409	0.002	0.050	0.046	152.953	0.012	Tractors/Loaders/Backhoes
Road Grader	350	0.136	0.464	1.273	0.002	0.047	0.043	160.495	0.012	Graders
Track Type Dozer	350	0.186	0.714	1.673	0.002	0.066	0.061	181.298	0.017	Crawler Tractors
Backhoe/Front Loader	350	0.167	0.540	1.582	0.003	0.055	0.051	241.181	0.015	Tractors/Loaders/Backhoes

[a] From Table 20

[b] Diesel PM2.5 emission factor [lb/hr] = PM10 emission factor [lb/hr] x PM2.5 fraction of PM10

PM2.5 Fraction= 0.920

From Appendix A, Final–Methodology to Calculate Particulate Matter (PM) 2.5
and PM 2.5 Significance Thresholds, SCAQMD, October 2006,
http://www.aqmd.gov/ceqa/handbook/PM2_5/PM2_5.html

Table 6
Construction Emissions
Roads and Landing Work - 2013

Construction Equipment Daily Criteria Pollutant Exhaust Emissions

Equipment	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
Drum Type Compactor	0.54	1.63	5.64	0.01	0.20	0.18
Road Grader	0.54	1.86	5.09	0.01	0.19	0.17
Track Type Dozer	1.12	4.28	10.04	0.01	0.40	0.36
Backhoe/Front Loader	1.00	3.24	9.49	0.02	0.33	0.30
Total	**3.20**	**11.01**	**30.26**	**0.04**	**1.11**	**1.02**

[a] Emissions [lb/day] = number x hours/day x emission factor [lb/hr]

Construction Equipment Total Greenhouse Gas Emissions

Equipment	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
Drum Type Compactor	8.3	0.0	8.3
Road Grader	8.7	0.0	8.8
Track Type Dozer	14.8	0.0	14.8
Backhoe/Front Loader	19.7	0.0	19.7
Total	**51.6**	**0.0**	**51.6**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x hours/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Usage

Vehicle	Number[a]	Days Used	Hours Used/ Day	Miles/ Day/ Veh.
Offsite				
Water Truck	2	30		50
Lowboy Truck/Trailer	1	30		50
1 Ton Crew Cab, 4X4	2	30		50
Worker Commute	5	30		25

Table 6
Construction Emissions
Roads and Landing Work - 2013

Motor Vehicle Exhaust Emission Factors

Vehicle	Category	VOC (lb/mi)[a]	CO (lb/mi)[a]	NOX (lb/mi)[a]	SOX (lb/mi)[a]	PM10 (lb/mi)[a]	PM2.5 (lb/mi)[b]	CO2 (lb/mi)[a]	CH4 (lb/mi)[a]
Offsite									
Water Truck	HHDT	5.00E-04	2.00E-03	9.00E-03	1.00E-05	1.70E-04	1.56E-04	1.16E+00	2.00E-05
Lowboy Truck/Trailer	Passenger	2.00E-03	9.00E-03	2.80E-02	4.00E-05	1.10E-03	1.01E-03	4.50E+00	9.00E-05
1 Ton Crew Cab, 4X4	Passenger	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05
Worker Commute	Passenger	3.00E-04	7.00E-03	1.00E-03	1.00E-05	9.00E-05	8.37E-05	1.02E+00	7.00E-05

[a] From Table 20

Motor Vehicle Daily Criteria Pollutant Exhaust Emissions

Vehicle	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
Offsite						
Water Truck	0.05	0.20	0.90	0.00	0.02	0.02
Lowboy Truck/Trailer	0.10	0.45	1.40	0.00	0.06	0.05
1 Ton Crew Cab, 4X4	0.02	0.10	0.30	0.00	0.02	0.02
Worker Commute	0.04	0.88	0.13	0.00	0.01	0.01
Offsite Total	**0.21**	**1.63**	**2.73**	**0.01**	**0.10**	**0.09**
Total	**0.21**	**1.63**	**2.73**	**0.01**	**0.10**	**0.09**

[a] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Motor Vehicle Total Greenhouse Gas Emissions

Vehicle	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
Offsite			
Water Truck	1.6	0.0	1.6
Lowboy Truck/Trailer	3.1	0.0	3.1
1 Ton Crew Cab, 4X4	6.1	0.0	6.1
Worker Commute	1.7	0.0	1.7
Offsite Total	**12.5**	**0.0**	**12.5**
Total	**12.5**	**0.0**	**12.5**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x miles/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Table 6
Construction Emissions
Roads and Landing Work - 2013

Motor Vehicle Fugitive Particulate Matter Emissions

Vehicle	Number	Road Type	Miles/ Day/ Vehicle	PM10 Emission Factor (lb/mi)[a]	PM2.5 Emission Factor (lb/mi)[a]	PM10 Emissions (lb/day)[b]	PM2.5 Emissions (lb/day)[b]
Offsite							
Water Truck	2	Unpaved	50	0.140	0.030	14.00	2.95
1 Ton Crew Cab, 4X4	2	Unpaved	10	0.140	0.030	2.80	0.59
Worker Commute	5	Unpaved	5	0.140	0.030	3.50	0.74
Worker Commute	5	Paved	20	0.001	2.00E-04	0.11	0.02
Offsite Total				**0.42**	**0.09**	**20.30**	**4.28**
Total				**0.42**	**0.09**	**20.30**	**4.28**

[a] From Table 20

[b] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Earthwork Fugitive Particulate Matter Emissions

Activity	Area Disturbed	Units	PM10 Emission Factor[a]	PM2.5 Emission Factor[b]	PM10 (lb/day)[c]	PM2.5 (lb/day)[c]
Roads & Landing Work	5.21	acre	20.0	4.16	104.20	21.67
Total (Uncontrolled)					104.20	21.67
Total (Controlled)					**52.10**	**10.84**

a. PM10 emissions were estimated based on an emission factor of 20 lbs of PM10 per acre per day

b. PM2.5 emissions were estimated using a SCAQMD PM2.5 fraction 0.208 of PM10 for construction fugitive dust

c. Controlled emissions assume a 50% control from watering

Table 7
Construction Emissions
Guard Structure Installation - 2013

Emissions Summary

Source	VOC (lb/day)	CO (lb/day)	NOX (lb/day)	SOX (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2e (MT)
Construction Equipment Exhaust	3.44	12.19	31.89	0.05	1.23	1.13	44.3
Onsite Motor Vehicle Exhaust							
Onsite Motor Vehicle Fugitive PM	--	--	--	--			
Earthwork Fugitive PM	--	--	--	--			
Onsite Total	**3.44**	**12.19**	**31.89**	**0.05**	**1.23**	**1.13**	**44.3**
Offsite Motor Vehicle Exhaust	0.08	1.20	0.60	0.00	0.04	0.04	2.4
Offsite Motor Vehicle Fugitive PM	--	--	--	--	8.40	1.77	
Offsite Total	**0.08**	**1.20**	**0.60**	**0.00**	**8.44**	**1.81**	**2.4**
Total	**3.51**	**13.39**	**32.49**	**0.05**	**9.67**	**2.94**	**46.7**
Total Phase (lb/Phase)	**70.27**	**267.88**	**649.76**	**1.04**	**193.34**	**58.71**	
Total Phase (ton/Phase)	**0.04**	**0.13**	**0.32**	**0.00**	**0.10**	**0.03**	

# of working days 20 days

Construction Equipment Summary

Equipment	Horse-power	Number	Days Used	Hours Used/ Day
Auger Truck	500	1	20	6
Compressor	120	1	20	4
Extendable Flat Bed Pole Truck	350	1	20	6
80ft. Hydraulic Man-Lift	350	1	20	4
30-ton Crane Truck	500	1	20	6

Construction Equipment Exhaust Emission Factors

Equipment	Horse-power	VOC (lb/hr)[a]	CO (lb/hr)[a]	NOX (lb/hr)[a]	SOX (lb/hr)[a]	PM10 (lb/hr)[a]	PM2.5 (lb/hr)[b]	CO2 (lb/hr)[a]	CH4 (lb/hr)[a]	Category
Auger Truck	500	0.135	0.552	1.314	0.003	0.044	0.040	311.029	0.012	Bore/Drill Rigs
Compressor	120	0.087	0.327	0.526	0.001	0.048	0.044	46.908	0.008	Air Compressors
Extendable Flat Bed Pole Truck	350	0.158	0.466	1.361	0.002	0.049	0.045	190.463	0.014	Truck
80ft. Hydraulic Man-Lift	350	0.087	0.341	1.137	0.002	0.034	0.031	148.865	0.008	Aerial Lifts
30-ton Crane Truck	350	0.163	0.569	1.531	0.002	0.057	0.052	179.940	0.015	Cranes

[a] From Table 20

[b] Diesel PM2.5 emission factor [lb/hr] = PM10 emission factor [lb/hr] x PM2.5 fraction of PM10

PM2.5 Fraction= 0.920

From Appendix A, Final–Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds, SCAQMD, October 2006, http://www.aqmd.gov/ceqa/handbook/PM2_5/PM2_5.html

Table 7
Construction Emissions
Guard Structure Installation - 2013

Construction Equipment Daily Criteria Pollutant Exhaust Emissions

Equipment	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
Auger Truck	0.81	3.31	7.88	0.02	0.26	0.24
Compressor	0.35	1.31	2.10	0.00	0.19	0.18
Extendable Flat Bed Pole Truck	0.95	2.80	8.17	0.01	0.30	0.27
80ft. Hydraulic Man-Lift	0.35	1.36	4.55	0.01	0.14	0.12
30-ton Crane Truck	0.98	3.41	9.19	0.01	0.34	0.31
Total	**3.44**	**12.19**	**31.89**	**0.05**	**1.23**	**1.13**

[a] Emissions [lb/day] = number x hours/day x emission factor [lb/hr]

Construction Equipment Total Greenhouse Gas Emissions

Equipment	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
Auger Truck	16.9	0.0	16.9
Compressor	1.7	0.0	1.7
Extendable Flat Bed Pole Truck	10.4	0.0	10.4
80ft. Hydraulic Man-Lift	5.4	0.0	5.4
30-ton Crane Truck	9.8	0.0	9.8
Total	**44.2**	**0.0**	**44.3**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x hours/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Usage

Vehicle	Number[a]	Days Used	Hours Used/ Day	Miles/ Day/ Veh.
Offsite				
3/4 Ton Pick-Up Truck 4X4	2	20		50
1 Ton Crew Cab, 4X4	1	20		50
Worker Commute	6	20		25

Table 7
Construction Emissions
Guard Structure Installation - 2013

Motor Vehicle Exhaust Emission Factors

Vehicle	Category	VOC (lb/mi)[a]	CO (lb/mi)[a]	NOX (lb/mi)[a]	SOX (lb/mi)[a]	PM10 (lb/mi)[a]	PM2.5 (lb/mi)[b]	CO2 (lb/mi)[a]	CH4 (lb/mi)[a]
Offsite									
3/4 Ton Pick-Up Truck 4X4	HHDT	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05
1 Ton Crew Cab, 4X4	Passenger	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05
Worker Commute	Passenger	3.00E-04	7.00E-03	1.00E-03	1.00E-05	9.00E-05	8.37E-05	1.02E+00	7.00E-05

[a] From Table 20

Motor Vehicle Daily Criteria Pollutant Exhaust Emissions

Vehicle	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
Offsite						
3/4 Ton Pick-Up Truck 4X4	0.02	0.10	0.30	0.00	0.02	0.02
1 Ton Crew Cab, 4X4	0.01	0.05	0.15	0.00	0.01	0.01
Worker Commute	0.05	1.05	0.15	0.00	0.01	0.01
Offsite Total	**0.08**	**1.20**	**0.60**	**0.00**	**0.04**	**0.04**
Total	**0.08**	**1.20**	**0.60**	**0.00**	**0.04**	**0.04**

[a] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Motor Vehicle Total Greenhouse Gas Emissions

Vehicle	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
Offsite			
3/4 Ton Pick-Up Truck 4X4	0.7	0.0	0.7
1 Ton Crew Cab, 4X4	0.3	0.0	0.3
Worker Commute	1.4	0.0	1.4
Offsite Total	**2.4**	**0.0**	**2.4**
Total	**2.4**	**0.0**	**2.4**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x miles/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

a From Table 20

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Table 7
Construction Emissions
Guard Structure Installation - 2013

Motor Vehicle Fugitive Particulate Matter Emissions

Vehicle	Number	Road Type	Miles/ Day/ Vehicle	PM10 Emission Factor (lb/mi)[a]	PM2.5 Emission Factor (lb/mi)[a]	PM10 Emissions (lb/day)[b]	PM2.5 Emissions (lb/day)[b]
Offsite							
3/4 Ton Pick-Up Truck 4X4	2	Unpaved	10	0.140	0.030	2.80	0.59
1 Ton Crew Cab, 4X4	1	Unpaved	10	0.140	0.030	1.40	0.30
Worker Commute	6	Unpaved	5	0.140	0.030	4.20	0.89
Worker Commute	6	Paved	20	0.001	2.00E-04	0.13	0.02
Offsite Total				**0.42**	**0.09**	**8.40**	**1.77**
Total				**0.42**	**0.09**	**8.40**	**1.77**

[a] From Table 20

[b] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Earthwork Fugitive Particulate Matter Emissions

Activity	Area Disturbed	Units	PM10 Emission Factor[a]	PM2.5 Emission Factor[b]	PM10 (lb/day)[c]	PM2.5 (lb/day)[c]
Guard Structure Installation		acre	20.0	4.16		
Total (Uncontrolled)						
Total (Controlled)						

a. PM10 emissions were estimated based on an emission factor of 20 lbs of PM10 per acre per day

b. PM2.5 emissions were estimated using a SCAQMD PM2.5 fraction 0.208 of PM10 for construction fugitive dust

c. Controlled emissions assume a 50% control from watering

Table 8
Construction Emissions
Install Tower Foundations - 2013

Emissions Summary

Source	VOC (lb/day)	CO (lb/day)	NOX (lb/day)	SOX (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2e (MT)
Construction Equipment Exhaust	2.38	8.52	23.30	0.04	0.79	0.72	168.6
Onsite Motor Vehicle Exhaust							
Onsite Motor Vehicle Fugitive PM	--	--	--	--			
Earthwork Fugitive PM	--	--	--	--	2.50	0.52	
Onsite Total	**2.38**	**8.52**	**23.30**	**0.04**	**3.29**	**1.24**	**168.6**
Offsite Motor Vehicle Exhaust	0.25	2.73	4.13	0.01	0.18	0.16	50.3
Offsite Motor Vehicle Fugitive PM	--	--	--	--	23.10	4.87	
Offsite Total	**0.25**	**2.73**	**4.13**	**0.01**	**23.28**	**5.03**	**50.3**
Total	**2.63**	**11.25**	**27.42**	**0.05**	**26.56**	**6.27**	**219.0**
Total Phase (lb/Phase)	**236.96**	**1012.14**	**2468.16**	**4.64**	**2390.46**	**564.44**	
Total Phase (ton/Phase)	**0.12**	**0.51**	**1.23**	**0.00**	**1.20**	**0.28**	

# of working days 90 days

Construction Equipment Summary

Equipment	Horse-power	Number	Days Used	Hours Used/ Day
30 Ton Crane Truck	300	1	90	5
Auger Truck	500	1	90	8
Backhoe/ Front Loader	200	1	90	8

Construction Equipment Exhaust Emission Factors

Equipment	Horse-power	VOC (lb/hr)[a]	CO (lb/hr)[a]	NOX (lb/hr)[a]	SOX (lb/hr)[a]	PM10 (lb/hr)[a]	PM2.5 (lb/hr)[b]	CO2 (lb/hr)[a]	CH4 (lb/hr)[a]	Category
30 Ton Crane Truck	300	0.098	0.341	0.919	0.001	0.034	0.031	107.964	0.008	Cranes
Auger Truck	350	0.135	0.552	1.314	0.003	0.044	0.040	311.029	0.012	Bore/Drill Rigs
Backhoe/ Front Loader	350	0.101	0.300	1.024	0.002	0.033	0.031	137.266	0.009	Tractors/Loaders/Backhoes

[a] From Table 20

[b] Diesel PM2.5 emission factor [lb/hr] = PM10 emission factor [lb/hr] x PM2.5 fraction of PM10

PM2.5 Fraction= 0.920

From Appendix A, Final–Methodology to Calculate Particulate Matter (PM) 2.5
and PM 2.5 Significance Thresholds, SCAQMD, October 2006,
http://www.aqmd.gov/ceqa/handbook/PM2_5/PM2_5.html

Table 8
Construction Emissions
Install Tower Foundations - 2013

Construction Equipment Daily Criteria Pollutant Exhaust Emission

Equipment	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
30 Ton Crane Truck	0.49	1.71	4.60	0.01	0.17	0.16
Auger Truck	1.08	4.42	10.51	0.02	0.35	0.32
Backhoe/ Front Loader	0.81	2.40	8.19	0.01	0.27	0.24
Total	**2.38**	**8.52**	**23.30**	**0.04**	**0.79**	**0.72**

[a] Emissions [lb/day] = number x hours/day x emission factor [lb/hr]

Construction Equipment Total Greenhouse Gas Emissions

Equipment	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
30 Ton Crane Truck	22.0	0.0	22.1
Auger Truck	101.6	0.0	101.7
Backhoe/ Front Loader	44.8	0.0	44.9
Total	**168.4**	**0.0**	**168.6**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x hours/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Usage

Vehicle	Number[a]	Days Used	Hours Used/ Day	Miles/ Day/ Veh.
Offsite				
4,000 Gallon Water Truck	1	90		50
10 cu. Yd. Concrete Mixer Truck	3	90		50
1 Ton Crew Cab Flat Bed, 4x4	2	90		50
10 Cubic Yard Dump Truck	2	90		50
Worker Commute	9	90		25

Table 8
Construction Emissions
Install Tower Foundations - 2013

Motor Vehicle Exhaust Emission Factors

Vehicle	Category	VOC (lb/mi)[a]	CO (lb/mi)[a]	NOX (lb/mi)[a]	SOX (lb/mi)[a]	PM10 (lb/mi)[a]	PM2.5 (lb/mi)[b]	CO2 (lb/mi)[a]	CH4 (lb/mi)[a]
Offsite									
4,000 Gallon Water Truck	HHDT	5.00E-04	2.00E-03	9.00E-03	1.00E-05	1.70E-04	1.56E-04	1.16E+00	2.00E-05
10 cu. Yd. Concrete Mixer Truck	Passenger	6.00E-04	5.00E-03	1.50E-02	3.00E-05	7.50E-04	6.90E-04	3.32E+00	3.00E-05
1 Ton Crew Cab Flat Bed, 4x4	Passenger	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05
10 Cubic Yard Dump Truck	HHDT	5.00E-04	2.00E-03	9.00E-03	1.00E-05	1.70E-04	1.56E-04	1.16E+00	2.00E-05
Worker Commute	Passenger	3.00E-04	7.00E-03	1.00E-03	1.00E-05	9.00E-05	8.37E-05	1.02E+00	7.00E-05

[a] From Table 20

Motor Vehicle Daily Criteria Pollutant Exhaust Emissions

Vehicle	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
Offsite						
4,000 Gallon Water Truck	0.03	0.10	0.45	0.00	0.01	0.01
10 cu. Yd. Concrete Mixer Truck	0.09	0.75	2.25	0.00	0.11	0.10
1 Ton Crew Cab Flat Bed, 4x4	0.02	0.10	0.30	0.00	0.02	0.02
10 Cubic Yard Dump Truck	0.05	0.20	0.90	0.00	0.02	0.02
Worker Commute	0.07	1.58	0.23	0.00	0.02	0.02
Offsite Total	**0.25**	**2.73**	**4.13**	**0.01**	**0.18**	**0.16**
Total	**0.25**	**2.73**	**4.13**	**0.01**	**0.18**	**0.16**

[a] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Motor Vehicle Total Greenhouse Gas Emissions

Vehicle	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
Offsite			
4,000 Gallon Water Truck	2.4	0.0	2.4
10 cu. Yd. Concrete Mixer Truck	20.3	0.0	20.3
1 Ton Crew Cab Flat Bed, 4x4	13.5	0.0	13.5
10 Cubic Yard Dump Truck	4.8	0.0	4.8
Worker Commute	9.3	0.0	9.3
Offsite Total	**50.3**	**0.0**	**50.3**
Total	**50.3**	**0.0**	**50.3**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x miles/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Table 8
Construction Emissions
Install Tower Foundations - 2013

Motor Vehicle Fugitive Particulate Matter Emissions

Vehicle	Number	Road Type	Miles/ Day/ Vehicle	PM10 Emission Factor (lb/mi)[a]	PM2.5 Emission Factor (lb/mi)[a]	PM10 Emissions (lb/day)[b]	PM2.5 Emissions (lb/day)[b]
Onsite							
None							
Onsite Total							
Offsite							
10 cu. Yd. Concrete Mixer Truck	3	Unpaved	10	0.140	0.030	4.20	0.89
1 Ton Crew Cab Flat Bed, 4x4	2	Unpaved	10	0.140	0.030	2.80	0.59
10 Cubic Yard Dump Truck	2	Unpaved	10	0.140	0.030	2.80	0.59
4,000 Gallon Water Truck	1	Unpaved	50	0.140	0.030	7.00	1.48
Worker Commute	9	Unpaved	5	0.140	0.030	6.30	1.33
Worker Commute	9	Paved	20	0.001	2.00E-04	0.20	0.04
Offsite Total				**0.70**	**0.15**	**23.10**	**4.87**
Total				**0.70**	**0.15**	**23.10**	**4.87**

[a] From Table 20

[b] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Earthwork Fugitive Particulate Matter Emissions

Activity	Area Disturbed	Units	PM10 Emission Factor[a]	PM2.5 Emission Factor[b]	PM10 (lb/day)[c]	PM2.5 (lb/day)[c]
Install Tower Foundations	0.25	acre	20.0	4.16	5.00	1.04
Total (Uncontrolled)					5.00	1.04
Total (Controlled)					**2.50**	**0.52**

a. PM10 emissions were estimated based on an emission factor of 20 lbs of PM10 per acre per day

b. PM2.5 emissions were estimated using a SCAQMD PM2.5 fraction 0.208 of PM10 for construction fugitive dust

c. Controlled emissions assume a 50% control from watering

Table 9
Construction Emissions
Tower Steel Haul - 2013

Emissions Summary

Source	VOC (lb/day)	CO (lb/day)	NOX (lb/day)	SOX (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2e (MT)
Construction Equipment Exhaust	0.65	1.87	6.76	0.01	0.22	0.20	7.4
Onsite Motor Vehicle Exhaust							
Onsite Motor Vehicle Fugitive PM	--	--	--	--			
Earthwork Fugitive PM	--	--	--	--	10.00	2.08	
Onsite Total	**0.65**	**1.87**	**6.76**	**0.01**	**10.22**	**2.28**	**7.4**
Offsite Motor Vehicle Exhaust	0.10	1.00	1.30	0.00	0.04	0.04	2.7
Offsite Motor Vehicle Fugitive PM	--	--	--	--	8.40	1.77	
Offsite Total	**0.10**	**1.00**	**1.30**	**0.00**	**8.44**	**1.81**	**2.7**
Total	**0.75**	**2.87**	**8.06**	**0.01**	**18.66**	**4.09**	**10.1**
Total Phase (lb/Phase)	**14.98**	**57.32**	**161.12**	**0.24**	**373.25**	**81.83**	
Total Phase (ton/Phase)	**0.01**	**0.03**	**0.08**	**0.00**	**0.19**	**0.04**	

# of working days 20 days

Construction Equipment Summary

Equipment	Horse-power	Number	Days Used	Hours Used/ Day
10,000 lb Rough Terrain Fork Lift	200	1	20	6

Construction Equipment Exhaust Emission Factors

Equipment	Horse-power	VOC (lb/hr)[a]	CO (lb/hr)[a]	NOX (lb/hr)[a]	SOX (lb/hr)[a]	PM10 (lb/hr)[a]	PM2.5 (lb/hr)[b]	CO2 (lb/hr)[a]	CH4 (lb/hr)[a]	Category
10,000 lb Rough Terrain Fork Lift	200	0.108	0.311	1.126	0.002	0.037	0.034	136.515	0.010	Forklifts

[a] From Table 20

[b] Diesel PM2.5 emission factor [lb/hr] = PM10 emission factor [lb/hr] x PM2.5 fraction of PM10

PM2.5 Fraction= 0.920

From Appendix A, Final–Methodology to Calculate Particulate Matter (PM) 2.5
and PM 2.5 Significance Thresholds, SCAQMD, October 2006,
http://www.aqmd.gov/ceqa/handbook/PM2_5/PM2_5.html

Construction Equipment Daily Criteria Pollutant Exhaust Emission

Equipment	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
10,000 lb Rough Terrain Fork Lift	0.65	1.87	6.76	0.01	0.22	0.20
Total	**0.65**	**1.87**	**6.76**	**0.01**	**0.22**	**0.20**

[a] Emissions [lb/day] = number x hours/day x emission factor [lb/hr]

Table 9
Construction Emissions
Tower Steel Haul - 2013

Construction Equipment Total Greenhouse Gas Emissions

Equipment	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
10,000 lb Rough Terrain Fork Lift	7.4	0.0	7.4
Total	**7.4**	**0.0**	**7.4**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x hours/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Usage

Vehicle	Number	Days Used	Hours Used/ Day	Miles/ Day/ Veh.
Offsite				
1 Ton Crew Cab, 4X4	2	20		50
Boom/Crane Truck				
40' Flat Bed Truck & Trailer	2	20		50
Worker Commute	4	20		25

Motor Vehicle Exhaust Emission Factors

Vehicle	Category	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
Offsite									
1 Ton Crew Cab, 4X4	Passenger	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05
Boom/Crane Truck	HHDT	5.00E-04	2.00E-03	9.00E-03	1.00E-05	1.70E-04	1.56E-04	1.16E+00	2.00E-05
40' Flat Bed Truck & Trailer	HHDT	5.00E-04	2.00E-03	9.00E-03	1.00E-05	1.70E-04	1.56E-04	1.16E+00	2.00E-05
Worker Commute	Passenger	3.00E-04	7.00E-03	1.00E-03	1.00E-05	9.00E-05	8.37E-05	1.02E+00	7.00E-05

[a] From Table 20

Motor Vehicle Daily Criteria Pollutant Exhaust Emissions

Vehicle	VOC	CO	NOX	SOX	PM10	PM2.5
Offsite						
1 Ton Crew Cab, 4X4	0.02	0.10	0.30	0.00	0.02	0.02
40' Flat Bed Truck & Trailer	0.05	0.20	0.90	0.00	0.02	0.02
Worker Commute	0.03	0.70	0.10	0.00	0.01	0.01
Offsite Total	**0.10**	**1.00**	**1.30**	**0.00**	**0.04**	**0.04**
Total	**0.10**	**1.00**	**1.30**	**0.00**	**0.04**	**0.04**

[a] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Table 9
Construction Emissions
Tower Steel Haul - 2013

Motor Vehicle Total Greenhouse Gas Emissions

Vehicle	CO2	CH4	CO2e
Offsite			
1 Ton Crew Cab, 4X4	0.7	0.0	0.7
40' Flat Bed Truck & Trailer	1.1	0.0	1.1
Worker Commute	0.9	0.0	0.9
Offsite Total	**2.7**	**0.0**	**2.7**
Total	**2.7**	**0.0**	**2.7**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x miles/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Fugitive Particulate Matter Emissions

Vehicle	Number	Road	Miles/	PM10	PM2.5	PM10	PM2.5
Onsite							
None							
Onsite Total							
Offsite							
1 Ton Crew Cab, 4X4	2	Unpaved	10	0.140	0.030	2.80	0.59
40' Flat Bed Truck & Trailer	2	Unpaved	10	0.140	0.030	2.80	0.59
Worker Commute	4	Unpaved	5	0.140	0.030	2.80	0.59
Worker Commute	4	Paved	20	0.001	2.00E-04	0.09	0.02
Offsite Total						**8.40**	**1.77**
Total						**8.40**	**1.77**

[a] From Table 20

[b] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Earthwork Fugitive Particulate Matter Emissions

Activity	Area Disturbed	Units	PM10 Emission Factor[a]	PM2.5 Emission Factor[b]	PM10 (lb/day)[c]	PM2.5 (lb/day)[c]
Tower Steel Haul	1	acre	20.0	4.16	20.00	4.16
Total (Uncontrolled)					20.00	4.16
Total (Controlled)					**10.00**	**2.08**

a. PM10 emissions were estimated based on an emission factor of 20 lbs of PM10 per acre per day

b. PM2.5 emissions were estimated using a SCAQMD PM2.5 fraction 0.208 of PM10 for construction fugitive dust

c. Controlled emissions assume a 50% control from watering

Table 10
Construction Emissions
Tower Steel Assembly - 2013

Emissions Summary

Source	VOC (lb/day)	CO (lb/day)	NOX (lb/day)	SOX (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2e (MT)
Construction Equipment Exhaust	4.62	16.90	33.12	0.04	2.24	2.06	137.9
Onsite Motor Vehicle Exhaust							
Onsite Motor Vehicle Fugitive PM	--	--	--	--			
Earthwork Fugitive PM	--	--	--	--			
Onsite Total	**4.62**	**16.90**	**33.12**	**0.04**	**2.24**	**2.06**	**137.9**
Offsite Motor Vehicle Exhaust	0.16	2.70	1.10	0.01	0.07	0.07	19.2
Offsite Motor Vehicle Fugitive PM	--	--	--	--	16.80	3.54	
Offsite Total	**0.16**	**2.70**	**1.10**	**0.01**	**16.87**	**3.61**	**19.2**
Total	**4.77**	**19.60**	**34.22**	**0.04**	**19.11**	**5.67**	**157.1**
Total Phase (lb/Phase)	**429.71**	**1764.36**	**3080.16**	**3.85**	**1720.08**	**510.06**	
Total Phase (ton/Phase)	**0.21**	**0.88**	**1.54**	**0.00**	**0.86**	**0.26**	
# of working days	90	days					

Construction Equipment Summary

Equipment	Horse-power	Number	Days Used	Hours Used/ Day
30 Ton Crane Truck	300	2	90	8
Compressor Trailer	300	2	90	6

Construction Equipment Exhaust Emission Factors

Equipment	Horse-power	VOC (lb/hr)[a]	CO (lb/hr)[a]	NOX (lb/hr)[a]	SOX (lb/hr)[a]	PM10 (lb/hr)[a]	PM2.5 (lb/hr)[b]	CO2 (lb/hr)[a]	CH4 (lb/hr)[a]	Category
30 Ton Crane Truck	300	0.098	0.341	0.919	0.001	0.034	0.031	107.964	0.008	Cranes
Compressor Trailer	300	0.254	0.954	1.535	0.002	0.141	0.130	136.815	0.023	Air Compressors

[a] From Table 20

[b] Diesel PM2.5 emission factor [lb/hr] = PM10 emission factor [lb/hr] x PM2.5 fraction of PM10

PM2.5 Fraction= 0.920

From Appendix A, Final–Methodology to Calculate Particulate Matter (PM) 2.5
and PM 2.5 Significance Thresholds, SCAQMD, October 2006,
http://www.aqmd.gov/ceqa/handbook/PM2_5/PM2_5.html

Table 10
Construction Emissions
Tower Steel Assembly - 2013

Construction Equipment Daily Criteria Pollutant Exhaust Emission

Equipment	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
30 Ton Crane Truck	1.57	5.46	14.70	0.02	0.55	0.50
Compressor Trailer	3.05	11.45	18.42	0.02	1.69	1.56
Total	**4.62**	**16.90**	**33.12**	**0.04**	**2.24**	**2.06**

[a] Emissions [lb/day] = number x hours/day x emission factor [lb/hr]

Construction Equipment Total Greenhouse Gas Emissions

Equipment	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
30 Ton Crane Truck	70.5	0.0	70.6
Compressor Trailer	67.0	0.0	67.3
Total	**137.5**	**0.0**	**137.9**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x hours/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Usage

Vehicle	Number[a]	Days Used	Hours Used/ Day	Miles/ Day/ Veh.
Offsite				
1 Ton Crew Cab Flat Bed, 4x4	2	90		50
3/4 Ton Pick-Up Truck 4X4	3	90		50
Worker Commute	14	90		25

Motor Vehicle Exhaust Emission Factors

Vehicle	Category	VOC (lb/mi)[a]	CO (lb/mi)[a]	NOX (lb/mi)[a]	SOX (lb/mi)[a]	PM10 (lb/mi)[a]	PM2.5 (lb/mi)[b]	CO2 (lb/mi)[a]	CH4 (lb/mi)[a]
Offsite									
1 Ton Crew Cab Flat Bed, 4x4	HHDT	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05
3/4 Ton Pick-Up Truck 4X4	Passenger	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05
Worker Commute	Passenger	3.00E-04	7.00E-03	1.00E-03	1.00E-05	9.00E-05	8.37E-05	1.02E+00	7.00E-05

[a] From Table 20

Table 10
Construction Emissions
Tower Steel Assembly - 2013

Motor Vehicle Daily Criteria Pollutant Exhaust Emissions

Vehicle	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
Offsite						
1 Ton Crew Cab Flat Bed, 4x4	0.02	0.10	0.30	0.00	0.02	0.02
3/4 Ton Pick-Up Truck 4X4	0.03	0.15	0.45	0.00	0.03	0.02
Worker Commute	0.11	2.45	0.35	0.00	0.03	0.03
Offsite Total	**0.16**	**2.70**	**1.10**	**0.01**	**0.07**	**0.07**
Total	**0.16**	**2.70**	**1.10**	**0.01**	**0.07**	**0.07**

[a] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Motor Vehicle Total Greenhouse Gas Emissions

Vehicle	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
Offsite			
1 Ton Crew Cab Flat Bed, 4x4			
3/4 Ton Pick-Up Truck 4X4	4.7	0.0	4.7
Worker Commute	14.5	0.0	14.5
Offsite Total	**19.2**	**0.0**	**19.2**
Total	**19.2**	**0.0**	**19.2**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x miles/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Fugitive Particulate Matter Emissions

Vehicle	Number	Road Type	Miles/ Day/ Vehicle	PM10 Emission Factor (lb/mi)[a]	PM2.5 Emission Factor (lb/mi)[a]	PM10 Emissions (lb/day)[b]	PM2.5 Emissions (lb/day)[b]
Offsite							
1 Ton Crew Cab Flat Bed, 4x4	2	Unpaved	10	0.140	0.030	2.80	0.59
3/4 Ton Pick-Up Truck 4X4	3	Unpaved	10	0.140	0.030	4.20	0.89
Worker Commute	14	Unpaved	5	0.140	0.030	9.80	2.07
Worker Commute	14	Paved	20	0.001	2.00E-04	0.31	0.06
Offsite Total						**16.80**	**3.54**
Total						**16.80**	**3.54**

[a] From Table 20

[b] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Table 10
Construction Emissions
Tower Steel Assembly - 2013

Earthwork Fugitive Particulate Matter Emissions

Activity	Area Disturbed	Units	PM10 Emission Factor[a]	PM2.5 Emission Factor[b]	PM10 (lb/day)[c]	PM2.5 (lb/day)[c]
Tower Steel Haul		acre	20.0	4.16		
Total (Uncontrolled)						
Total (Controlled)						

a. PM10 emissions were estimated based on an emission factor of 20 lbs of PM10 per acre per day

b. PM2.5 emissions were estimated using a SCAQMD PM2.5 fraction 0.208 of PM10 for construction fugitive dust

c. Controlled emissions assume a 50% control from watering

Table 11
Construction Emissions
Tower Erection - 2013

Emissions Summary

Source	VOC (lb/day)	CO (lb/day)	NOX (lb/day)	SOX (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2e (MT)
Construction Equipment Exhaust	2.51	9.14	18.40	0.02	1.19	1.09	77.8
Onsite Motor Vehicle Exhaust							
Onsite Motor Vehicle Fugitive PM	--	--	--	--			
Earthwork Fugitive PM	--	--	--	--			
Onsite Total	**2.51**	**9.14**	**18.40**	**0.02**	**1.19**	**1.09**	**77.8**
Offsite Motor Vehicle Exhaust	0.10	1.60	0.80	0.00	0.05	0.05	14.6
Offsite Motor Vehicle Fugitive PM	--	--	--	--	11.20	2.36	
Offsite Total	**0.10**	**1.60**	**0.80**	**0.00**	**11.25**	**2.41**	**14.6**
Total	**2.61**	**10.74**	**19.20**	**0.02**	**12.44**	**3.50**	**92.34**
Total Phase (lb/Phase)	**234.50**	**966.42**	**1727.64**	**2.20**	**1119.55**	**315.04**	
Total Phase (ton/Phase)	**0.12**	**0.48**	**0.86**	**0.00**	**0.56**	**0.16**	
# of working days	90	days					

Construction Equipment Summary

Equipment	Horse-power	Number	Days Used	Hours Used/ Day
180 Ton Rough Terrain Crane	500	1	90	6
Compressor Trailer	350	1	90	6

Construction Equipment Exhaust Emission Factors

Equipment	Horse-power	VOC (lb/hr)[a]	CO (lb/hr)[a]	NOX (lb/hr)[a]	SOX (lb/hr)[a]	PM10 (lb/hr)[a]	PM2.5 (lb/hr)[b]	CO2 (lb/hr)[a]	CH4 (lb/hr)[a]	Category
180 Ton Rough Terrain Crane	500	0.163	0.569	1.531	0.002	0.057	0.052	179.940	0.015	Cranes
Compressor Trailer	350	0.254	0.954	1.535	0.002	0.141	0.130	136.815	0.023	Air Compressors

[a] From Table 20

[b] Diesel PM2.5 emission factor [lb/hr] = PM10 emission factor [lb/hr] x PM2.5 fraction of PM10

PM2.5 Fraction= 0.920

From Appendix A, Final–Methodology to Calculate Particulate Matter (PM) 2.5
and PM 2.5 Significance Thresholds, SCAQMD, October 2006,
http://www.aqmd.gov/ceqa/handbook/PM2_5/PM2_5.html

Table 11
Construction Emissions
Tower Erection - 2013

Construction Equipment Daily Criteria Pollutant Exhaust Emissions

Equipment	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
180 Ton Rough Terrain Crane	0.98	3.41	9.19	0.01	0.34	0.31
Compressor Trailer	1.53	5.72	9.21	0.01	0.85	0.78
Total	**2.51**	**9.14**	**18.40**	**0.02**	**1.19**	**1.09**

[a] Emissions [lb/day] = number x hours/day x emission factor [lb/hr]

Construction Equipment Total Greenhouse Gas Emissions

Equipment	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
180 Ton Rough Terrain Crane	44.1	0.0	44.2
Compressor Trailer	33.5	0.0	33.6
Total	**77.6**	**0.0**	**77.8**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x hours/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Usage

Vehicle	Number	Days Used	Hours Used/ Day	Miles/ Day/ Veh.
Offsite				
3/4 Ton Pick-Up Truck 4X4	2	90		50
1 Ton Crew Cab Flat Bed, 4x4	2	90		50
Worker Commute	8	90		25

Motor Vehicle Exhaust Emission Factors

Vehicle	Category	VOC (lb/mi)[a]	CO (lb/mi)[a]	NOX (lb/mi)[a]	SOX (lb/mi)[a]	PM10 (lb/mi)[a]	PM2.5 (lb/mi)[b]	CO2 (lb/mi)[a]	CH4 (lb/mi)[a]
Offsite									
3/4 Ton Pick-Up Truck 4X4	Passenger	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05
1 Ton Crew Cab Flat Bed, 4x4	Delivery	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05
Worker Commute	Passenger	3.00E-04	7.00E-03	1.00E-03	1.00E-05	9.00E-05	8.37E-05	1.02E+00	7.00E-05

[a] From Table 20

Table 11
Construction Emissions
Tower Erection - 2013

Motor Vehicle Daily Criteria Pollutant Exhaust Emissions

Vehicle	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
Offsite						
3/4 Ton Pick-Up Truck 4X4	0.02	0.10	0.30	0.00	0.02	0.02
1 Ton Crew Cab Flat Bed, 4x4	0.02	0.10	0.30	0.00	0.02	0.02
Worker Commute	0.06	1.40	0.20	0.00	0.02	0.02
Offsite Total	**0.10**	**1.60**	**0.80**	**0.00**	**0.05**	**0.05**
Total	**0.10**	**1.60**	**0.80**	**0.00**	**0.05**	**0.05**

[a] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Motor Vehicle Total Greenhouse Gas Emissions

Vehicle	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
Offsite			
3/4 Ton Pick-Up Truck 4X4	3.1	0.0	3.1
1 Ton Crew Cab Flat Bed, 4x4	3.1	0.0	3.1
Worker Commute	8.3	0.0	8.3
Offsite Total	**14.5**	**0.0**	**14.6**
Total	**14.5**	**0.0**	**14.6**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x miles/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Fugitive Particulate Matter Emissions

Vehicle	Number	Road Type	Miles/ Day/ Vehicle	PM10 Emission Factor (lb/mi)[a]	PM2.5 Emission Factor (lb/mi)[a]	PM10 Emissions (lb/day)[b]	PM2.5 Emissions (lb/day)[b]
Offsite							
3/4 Ton Pick-Up Truck 4X4	2	Unpaved	10	0.140	0.030	2.80	0.59
1 Ton Crew Cab Flat Bed, 4x4	2	Unpaved	10	0.140	0.030	2.80	0.59
Worker Commute	8	Unpaved	5	0.140	0.030	5.60	1.18
Worker Commute	8	Paved	20	0.001	2.00E-04	0.18	0.03
Offsite Total						**11.20**	**2.36**
Total						**11.20**	**2.36**

[a] From Table 20

[b] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Table 11
Construction Emissions
Tower Erection - 2013

Earthwork Fugitive Particulate Matter Emissions

Activity	Area Disturbed	Units	PM10 Emission Factor[a]	PM2.5 Emission Factor[b]	PM10 (lb/day)[c]	PM2.5 (lb/day)[c]
Tower Steel Haul		acre	20.0	4.16		
Total (Uncontrolled)						
Total (Controlled)						

a. PM10 emissions were estimated based on an emission factor of 20 lbs of PM10 per acre per day

b. PM2.5 emissions were estimated using a SCAQMD PM2.5 fraction 0.208 of PM10 for construction fugitive dust

c. Controlled emissions assume a 50% control from watering

Table 12
Construction Emissions
Tower Erection - 2014

Emissions Summary

Source	VOC (lb/day)	CO (lb/day)	NOX (lb/day)	SOX (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2e (MT)
Construction Equipment Exhaust	2.51	9.14	18.40	0.02	1.19	1.09	25.9
Onsite Motor Vehicle Exhaust							
Onsite Motor Vehicle Fugitive PM	--	--	--	--			
Earthwork Fugitive PM	--	--	--	--			
Onsite Total	**2.51**	**9.14**	**18.40**	**0.02**	**1.19**	**1.09**	**25.9**
Offsite Motor Vehicle Exhaust	0.10	1.60	0.80	0.00	0.05	0.05	4.9
Offsite Motor Vehicle Fugitive PM	--	--	--	--	33.60	7.08	
Offsite Total	**0.10**	**1.60**	**0.80**	**0.00**	**33.65**	**7.13**	**4.9**
Total	**2.61**	**10.74**	**19.20**	**0.02**	**34.84**	**8.22**	**30.78**
Total Phase (lb/Phase)	**78.17**	**322.14**	**575.88**	**0.73**	**1045.18**	**246.61**	
Total Phase (ton/Phase)	**0.04**	**0.16**	**0.29**	**0.00**	**0.52**	**0.12**	

# of working days 30 days

Construction Equipment Summary

Equipment	Horse-power	Number	Days Used	Hours Used/ Day
180 Ton Rough Terrain Crane	500	1	30	6
Compressor Trailer	350	1	30	6

Construction Equipment Exhaust Emission Factors

Equipment	Horse-power	VOC (lb/hr)[a]	CO (lb/hr)[a]	NOX (lb/hr)[a]	SOX (lb/hr)[a]	PM10 (lb/hr)[a]	PM2.5 (lb/hr)[b]	CO2 (lb/hr)[a]	CH4 (lb/hr)[a]	Category
180 Ton Rough Terrain Crane	500	0.163	0.569	1.531	0.002	0.057	0.052	179.940	0.015	Cranes
Compressor Trailer	350	0.254	0.954	1.535	0.002	0.141	0.130	136.815	0.023	Air Compressors

[a] From Table 20

[b] Diesel PM2.5 emission factor [lb/hr] = PM10 emission factor [lb/hr] x PM2.5 fraction of PM10

PM2.5 Fraction= 0.920

From Appendix A, Final–Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds, SCAQMD, October 2006, http://www.aqmd.gov/ceqa/handbook/PM2_5/PM2_5.html

Table 12
Construction Emissions
Tower Erection - 2014

Construction Equipment Daily Criteria Pollutant Exhaust Emissions

Equipment	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
180 Ton Rough Terrain Crane	0.98	3.41	9.19	0.01	0.34	0.31
Compressor Trailer	1.53	5.72	9.21	0.01	0.85	0.78
Total	**2.51**	**9.14**	**18.40**	**0.02**	**1.19**	**1.09**

[a] Emissions [lb/day] = number x hours/day x emission factor [lb/hr]

Construction Equipment Total Greenhouse Gas Emissions

Equipment	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
180 Ton Rough Terrain Crane	14.7	0.0	14.7
Compressor Trailer	11.2	0.0	11.2
Total	**25.9**	**0.0**	**25.9**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x hours/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Usage

Vehicle	Number	Days Used	Hours Used/ Day	Miles/ Day/ Veh.
Offsite				
3/4 Ton Pick-Up Truck 4X4	2	30		50
1 Ton Crew Cab Flat Bed, 4x4	2	30		50
Worker Commute	8	30		25

Motor Vehicle Exhaust Emission Factors

Vehicle	Category	VOC (lb/mi)[a]	CO (lb/mi)[a]	NOX (lb/mi)[a]	SOX (lb/mi)[a]	PM10 (lb/mi)[a]	PM2.5 (lb/mi)[b]	CO2 (lb/mi)[a]	CH4 (lb/mi)[a]
Offsite									
3/4 Ton Pick-Up Truck 4X4	Passenger	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05
1 Ton Crew Cab Flat Bed, 4x4	Delivery	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05
Worker Commute	Passenger	3.00E-04	7.00E-03	1.00E-03	1.00E-05	9.00E-05	8.37E-05	1.02E+00	7.00E-05

[a] From Table 20

Table 12
Construction Emissions
Tower Erection - 2014

Motor Vehicle Daily Criteria Pollutant Exhaust Emissions

Vehicle	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
Offsite						
3/4 Ton Pick-Up Truck 4X4	0.02	0.10	0.30	0.00	0.02	0.02
1 Ton Crew Cab Flat Bed, 4x4	0.02	0.10	0.30	0.00	0.02	0.02
Worker Commute	0.06	1.40	0.20	0.00	0.02	0.02
Offsite Total	**0.10**	**1.60**	**0.80**	**0.00**	**0.05**	**0.05**
Total	**0.10**	**1.60**	**0.80**	**0.00**	**0.05**	**0.05**

[a] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Motor Vehicle Total Greenhouse Gas Emissions

Vehicle	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
Offsite			
3/4 Ton Pick-Up Truck 4X4	1.0	0.0	1.0
1 Ton Crew Cab Flat Bed, 4x4	1.0	0.0	1.0
Worker Commute	2.8	0.0	2.8
Offsite Total	**4.8**	**0.0**	**4.9**
Total	**4.8**	**0.0**	**4.9**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x miles/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Fugitive Particulate Matter Emissions

Vehicle	Number	Road Type	Miles/ Day/ Vehicle	PM10 Emission Factor (lb/mi)[a]	PM2.5 Emission Factor (lb/mi)[a]	PM10 Emissions (lb/day)[b]	PM2.5 Emissions (lb/day)[b]
Offsite							
3/4 Ton Pick-Up Truck 4X4	2	Unpaved	50	0.140	0.030	14.00	2.95
1 Ton Crew Cab Flat Bed, 4x4	2	Unpaved	50	0.140	0.030	14.00	2.95
Worker Commute	8	Unpaved	5	0.140	0.030	5.60	1.18
Worker Commute	8	Paved	20	0.001	2.00E-04	0.18	0.03
Offsite Total						**33.60**	**7.08**
Total						**33.60**	**7.08**

[a] From Table 20

[b] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Table 12
Construction Emissions
Tower Erection - 2014

Earthwork Fugitive Particulate Matter Emissions

Activity	Area Disturbed	Units	PM10 Emission Factor[a]	PM2.5 Emission Factor[b]	PM10 (lb/day)[c]	PM2.5 (lb/day)[c]
Tower Steel Haul		acre	20.0	4.16		
Total (Uncontrolled)						
Total (Controlled)						

a. PM10 emissions were estimated based on an emission factor of 20 lbs of PM10 per acre per day

b. PM2.5 emissions were estimated using a SCAQMD PM2.5 fraction 0.208 of PM10 for construction fugitive dust

c. Controlled emissions assume a 50% control from watering

Table 13
Construction Emissions
Install Conductor & OPGW - 2013

Emissions Summary

Source	VOC (lb/day)	CO (lb/day)	NOX (lb/day)	SOX (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2e (MT)
Construction Equipment Exhaust	8.78	31.38	86.71	0.13	2.96	2.72	243.1
Onsite Motor Vehicle Exhaust							
Onsite Motor Vehicle Fugitive PM	--	--	--	--			
Earthwork Fugitive PM	--	--	--	--			
Onsite Total	**8.78**	**31.38**	**86.71**	**0.13**	**2.96**	**2.72**	**243.1**
Offsite Motor Vehicle Exhaust	0.63	7.30	7.00	0.02	0.28	0.26	38.1
Offsite Motor Vehicle Fugitive PM	--	--	--	--	50.40	10.62	
Offsite Total	**0.63**	**7.30**	**7.00**	**0.02**	**50.68**	**10.88**	**38.1**
Total	**9.41**	**38.68**	**93.71**	**0.15**	**53.64**	**13.60**	**281.2**
Total Phase (lb/Phase)	**423.41**	**1740.47**	**4216.86**	**6.66**	**2413.73**	**612.00**	
Total Phase (ton/Phase)	**0.21**	**0.87**	**2.11**	**0.00**	**1.21**	**0.31**	
# working days	45 days						

Construction Equipment Summary

Equipment	Horse-power	Number	Days Used	Hours Used/ Day
30 Ton Manitex	350	4	45	6
22 Ton Manitex	350	1	45	8
Splicing Rig	350	2	45	2
Splicing Lab	300	2	45	2
20,000 lb. Rough Terrain Fork Lift	350	1	45	2
Spacing Cart	10	10	45	8
Static Truck	350	1	45	2
Static Tensioner	NA	1	45	2
60k Puller	525	1	45	3
3 Drum Straw Line Puller	300	2	45	4
580 case backhoe	120	1	45	2
Sag Cat w2 Cinch	350	2	45	2
D8 Cat	300	4	45	1

Table 13
Construction Emissions
Install Conductor & OPGW - 2013

Construction Equipment Exhaust Emission Factors

Equipment	Horse-power	VOC (lb/hr)[a]	CO (lb/hr)[a]	NOX (lb/hr)[a]	SOX (lb/hr)[a]	PM10 (lb/hr)[a]	PM2.5 (lb/hr)[b]	CO2 (lb/hr)[a]	CH4 (lb/hr)[a]	Category
30 Ton Manitex	350	0.087	0.341	1.137	0.002	0.034	0.031	148.865	0.008	Cranes
22 Ton Manitex	350	0.087	0.341	1.137	0.002	0.034	0.031	148.865	0.008	Cranes
Splicing Rig	350	0.158	0.466	1.361	0.002	0.049	0.045	190.463	0.014	Other Construction Equipment
Splicing Lab	300	0.158	0.466	1.361	0.002	0.049	0.045	190.463	0.014	Other Construction Equipment
20,000 lb. Rough Terrain Fork Lift	350	0.133	0.419	1.299	0.002	0.045	0.041	179.438	0.012	Forklifts
Spacing Cart	10	0.012	0.062	0.074	0.000	0.003	0.003	10.100	0.001	Other Construction Equipment
Static Truck	350	0.158	0.466	1.361	0.002	0.049	0.045	190.463	0.014	Other Construction Equipment
Static Tensioner	NA									Other Construction Equipment
60k Puller	525	0.237	0.699	2.042	0.003	0.074	0.068	285.694	0.021	Other Construction Equipment
3 Drum Straw Line Puller	300	0.136	0.399	1.167	0.002	0.042	0.039	163.254	0.012	Other Construction Equipment
580 case backhoe	120	0.076	0.355	0.491	0.001	0.043	0.040	51.682	0.007	Tractors/Loaders/Backhoes
Sag Cat w2 Cinch	350	0.170	0.540	1.582	0.003	0.055	0.051	241.181	0.015	Other Construction Equipment
D8 Cat	300	0.143	0.462	1.356	0.002	0.047	0.043	206.726	0.013	Crawler Tractors

[a] From Table 20

[b] Diesel PM2.5 emission factor [lb/hr] = PM10 emission factor [lb/hr] x PM2.5 fraction of PM10

PM2.5 Fraction= 0.920

From Appendix A, Final–Methodology to Calculate Particulate Matter (PM) 2.5
and PM 2.5 Significance Thresholds, SCAQMD, October 2006,
http://www.aqmd.gov/ceqa/handbook/PM2_5/PM2_5.html

Construction Equipment Daily Criteria Pollutant Exhaust Emissions

Equipment	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
30 Ton Manitex	2.09	8.18	27.29	0.04	0.81	0.75
22 Ton Manitex	0.70	2.73	9.10	0.01	0.27	0.25
Splicing Rig	0.63	1.86	5.44	0.01	0.20	0.18
Splicing Lab	0.63	1.86	5.44	0.01	0.20	0.18
20,000 lb. Rough Terrain Fork Lift	0.27	0.84	2.60	0.00	0.09	0.08
Spacing Cart	0.94	4.96	5.92	0.02	0.24	0.22
Static Truck	0.32	0.93	2.72	0.00	0.10	0.09
Static Tensioner						
60k Puller	0.71	2.10	6.13	0.01	0.22	0.20
3 Drum Straw Line Puller	1.09	3.19	9.34	0.01	0.34	0.31
580 case backhoe	0.15	0.71	0.98	0.00	0.09	0.08
Sag Cat w2 Cinch	0.68	2.16	6.33	0.01	0.22	0.20
D8 Cat	0.57	1.85	5.42	0.01	0.19	0.17
Total	**8.78**	**31.38**	**86.71**	**0.13**	**2.96**	**2.72**

[a] Emissions [lb/day] = number x hours/day x emission factor [lb/hr]

Construction Equipment Total Greenhouse Gas Emissions

Table 13
Construction Emissions
Install Conductor & OPGW - 2013

Equipment	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
30 Ton Manitex	72.9	0.0	73.0
22 Ton Manitex	24.3	0.0	24.3
Splicing Rig	15.6	0.0	15.6
Splicing Lab	15.6	0.0	15.6
20,000 lb. Rough Terrain Fork Lift	7.3	0.0	7.3
Spacing Cart	16.5	0.0	16.5
Static Truck	7.8	0.0	7.8
Static Tensioner			
60k Puller	17.5	0.0	17.5
3 Drum Straw Line Puller	26.7	0.0	26.7
580 case backhoe	2.1	0.0	2.1
Sag Cat w2 Cinch	19.7	0.0	19.7
D8 Cat	16.9	0.0	16.9
Total	**242.8**	**0.0**	**243.1**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x hours/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Usage

Vehicle	Number	Days Used	Hours Used/ Day	Miles/ Day/ Veh.
Offsite				
3/4 Ton Pick-Up Truck 4X4	6	45		50
1 Ton Crew Cab Flat Bed, 4x4	5	45		50
Pole Truck & Trailer	1	45		40
Wire Truck & Trailer	6	45		50
Dump Truck (Trash)	1	45		50
Lowboy Truck/Trailer	1	45		10
Worker Commute	32	45		25

Table 13
Construction Emissions
Install Conductor & OPGW - 2013

Motor Vehicle Exhaust Emission Factors

Vehicle	Category	VOC (lb/mi)[a]	CO (lb/mi)[a]	NOX (lb/mi)[a]	SOX (lb/mi)[a]	PM10 (lb/mi)[a]	PM2.5 (lb/mi)[b]	CO2 (lb/mi)[a]	CH4 (lb/mi)[a]
Offsite									
3/4 Ton Pick-Up Truck 4X4	Delivery	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05
1 Ton Crew Cab Flat Bed, 4x4	Delivery	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05
Pole Truck & Trailer	HHDT	2.00E-03	9.00E-03	2.80E-02	4.00E-05	1.10E-03	1.01E-03	4.50E+00	9.00E-05
Wire Truck & Trailer	HHDT	5.00E-04	2.00E-03	9.00E-03	1.00E-05	1.70E-04	1.56E-04	1.16E+00	2.00E-05
Dump Truck (Trash)	HHDT	5.00E-04	2.00E-03	9.00E-03	1.00E-05	1.70E-04	1.56E-04	1.16E+00	2.00E-05
Lowboy Truck/Trailer	HHDT	2.00E-03	9.00E-03	2.80E-02	4.00E-05	1.10E-03	1.01E-03	4.50E+00	9.00E-05
Worker Commute	Passenger	3.00E-04	7.00E-03	1.00E-03	1.00E-05	9.00E-05	8.37E-05	1.02E+00	7.00E-05

[a] From Table 20

Motor Vehicle Daily Criteria Pollutant Exhaust Emissions

Vehicle	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
Offsite						
3/4 Ton Pick-Up Truck 4X4	0.06	0.30	0.90	0.00	0.05	0.05
1 Ton Crew Cab Flat Bed, 4x4	0.05	0.25	0.75	0.00	0.04	0.04
Pole Truck & Trailer	0.08	0.36	1.12	0.00	0.04	0.04
Wire Truck & Trailer	0.15	0.60	2.70	0.00	0.05	0.05
Dump Truck (Trash)	0.03	0.10	0.45	0.00	0.01	0.01
Lowboy Truck/Trailer	0.02	0.09	0.28	0.00	0.01	0.01
Worker Commute	0.24	5.60	0.80	0.01	0.07	0.07
Offsite Total	**0.63**	**7.30**	**7.00**	**0.02**	**0.28**	**0.26**
Total	**0.63**	**7.30**	**7.00**	**0.02**	**0.28**	**0.26**

[a] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Table 13
Construction Emissions
Install Conductor & OPGW - 2013

Motor Vehicle Total Greenhouse Gas Emissions

Vehicle	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
Offsite			
3/4 Ton Pick-Up Truck 4X4	4.7	0.0	4.7
1 Ton Crew Cab Flat Bed, 4x4	3.9	0.0	3.9
Pole Truck & Trailer	3.7	0.0	3.7
Wire Truck & Trailer	7.1	0.0	7.1
Dump Truck (Trash)	1.2	0.0	1.2
Lowboy Truck/Trailer	0.9	0.0	0.9
Worker Commute	16.6	0.0	16.6
Offsite Total	**38.1**	**0.0**	**38.1**
Total	**38.1**	**0.0**	**38.1**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x miles/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Fugitive Particulate Matter Emissions

Vehicle	Number	Road Type	Miles/ Day/ Vehicle	PM10 Emission Factor (lb/mi)[a]	PM2.5 Emission Factor (lb/mi)[a]	PM10 Emissions (lb/day)[b]	PM2.5 Emissions (lb/day)[b]
Offsite							
3/4 Ton Pick-Up Truck 4X4	6	Unpaved	10	0.140	0.030	8.40	1.77
1 Ton Crew Cab Flat Bed, 4x4	5	Unpaved	10	0.140	0.030	7.00	1.48
Pole Truck & Trailer	1	Unpaved	10	0.140	0.030	1.40	0.30
Wire Truck & Trailer	6	Unpaved	10	0.140	0.030	8.40	1.77
Dump Truck (Trash)	1	Unpaved	10	0.140	0.030	1.40	0.30
Lowboy Truck/Trailer	1	Unpaved	10	0.140	0.030	1.40	0.30
Worker Commute	32	Unpaved	5	0.140	0.030	22.40	4.72
Worker Commute	32	Paved	20	0.001	2.00E-04	0.70	0.13
Offsite Total						**50.40**	**10.62**
Total						**50.40**	**10.62**

[a] From Table 20

[b] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Table 13
Construction Emissions
Install Conductor & OPGW - 2013

Earthwork Fugitive Particulate Matter Emissions

Activity	Area Disturbed	Units	PM10 Emission Factor[a]	PM2.5 Emission Factor[b]	PM10 (lb/day)[c]	PM2.5 (lb/day)[c]
Install Conductor and OPGW		acre	20.0	4.16		
Total (Uncontrolled)						
Total (Controlled)						

a. PM10 emissions were estimated based on an emission factor of 20 lbs of PM10 per acre per day

b. PM2.5 emissions were estimated using a SCAQMD PM2.5 fraction 0.208 of PM10 for construction fugitive dust

c. Controlled emissions assume a 50% control from watering

Table 14
Construction Emissions
Install Conductor & OPGW - 2014

Emissions Summary

Source	VOC (lb/day)	CO (lb/day)	NOX (lb/day)	SOX (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2e (MT)
Construction Equipment Exhaust	8.78	31.38	86.71	0.13	2.96	2.72	135.1
Onsite Motor Vehicle Exhaust							
Onsite Motor Vehicle Fugitive PM	--	--	--	--			
Earthwork Fugitive PM	--	--	--	--			
Onsite Total	**8.78**	**31.38**	**86.71**	**0.13**	**2.96**	**2.72**	**135.1**
Offsite Motor Vehicle Exhaust	0.63	7.30	7.00	0.02	0.28	0.26	21.2
Offsite Motor Vehicle Fugitive PM	--	--	--	--	50.40	10.62	
Offsite Total	**0.63**	**7.30**	**7.00**	**0.02**	**50.68**	**10.88**	**21.2**
Total	**9.41**	**38.68**	**93.71**	**0.15**	**53.64**	**13.60**	**156.2**
Total Phase (lb/Phase)	**235.23**	**966.93**	**2342.70**	**3.70**	**1340.96**	**340.00**	
Total Phase (ton/Phase)	**0.12**	**0.48**	**1.17**	**0.00**	**0.67**	**0.17**	

working days 25 days

Construction Equipment Summary

Equipment	Horse-power	Number	Days Used	Hours Used/ Day
30 Ton Manitex	350	4	25	6
22 Ton Manitex	350	1	25	8
Splicing Rig	350	2	25	2
Splicing Lab	300	2	25	2
20,000 lb. Rough Terrain Fork Lift	350	1	25	2
Spacing Cart	10	10	25	8
Static Truck	350	1	25	2
Static Tensioner	NA	1	25	2
60k Puller	525	1	25	3
3 Drum Straw Line Puller	300	2	25	4
580 case backhoe	120	1	25	2
Sag Cat w2 Cinch	350	2	25	2
D8 Cat	300	4	25	1

Construction Equipment Exhaust Emission Factors

Equipment	Horse-power	VOC (lb/hr)[a]	CO (lb/hr)[a]	NOX (lb/hr)[a]	SOX (lb/hr)[a]	PM10 (lb/hr)[a]	PM2.5 (lb/hr)[b]	CO2 (lb/hr)[a]	CH4 (lb/hr)[a]	Category
30 Ton Manitex	350	0.087	0.341	1.137	0.002	0.034	0.031	148.865	0.008	Cranes
22 Ton Manitex	350	0.087	0.341	1.137	0.002	0.034	0.031	148.865	0.008	Cranes
Splicing Rig	350	0.158	0.466	1.361	0.002	0.049	0.045	190.463	0.014	Other Construction Equipment
Splicing Lab	300	0.158	0.466	1.361	0.002	0.049	0.045	190.463	0.014	Other Construction Equipment
20,000 lb. Rough Terrain Fork Lift	350	0.133	0.419	1.299	0.002	0.045	0.041	179.438	0.012	Forklifts
Spacing Cart	10	0.012	0.062	0.074	0.000	0.003	0.003	10.100	0.001	Other Construction Equipment
Static Truck	350	0.158	0.466	1.361	0.002	0.049	0.045	190.463	0.014	Other Construction Equipment
Static Tensioner	NA									Other Construction Equipment
60k Puller	525	0.237	0.699	2.042	0.003	0.074	0.068	285.694	0.021	Other Construction Equipment
3 Drum Straw Line Puller	300	0.136	0.399	1.167	0.002	0.042	0.039	163.254	0.012	Other Construction Equipment
580 case backhoe	120	0.076	0.355	0.491	0.001	0.043	0.040	51.682	0.007	Tractors/Loaders/Backhoes
Sag Cat w2 Cinch	350	0.170	0.540	1.582	0.003	0.055	0.051	241.181	0.015	Other Construction Equipment
D8 Cat	300	0.143	0.462	1.356	0.002	0.047	0.043	206.726	0.013	Crawler Tractors

[a] From Table 20

[b] Diesel PM2.5 emission factor [lb/hr] = PM10 emission factor [lb/hr] x PM2.5 fraction of PM10

PM2.5 Fraction= 0.920

From Appendix A, Final–Methodology to Calculate Particulate Matter (PM) 2.5
and PM 2.5 Significance Thresholds, SCAQMD, October 2006,
http://www.aqmd.gov/ceqa/handbook/PM2_5/PM2_5.html

Construction Equipment Daily Criteria Pollutant Exhaust Emission

Equipment	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
30 Ton Manitex	2.09	8.18	27.29	0.04	0.81	0.75
22 Ton Manitex	0.70	2.73	9.10	0.01	0.27	0.25
Splicing Rig	0.63	1.86	5.44	0.01	0.20	0.18
Splicing Lab	0.63	1.86	5.44	0.01	0.20	0.18
20,000 lb. Rough Terrain Fork Lift	0.27	0.84	2.60	0.00	0.09	0.08
Spacing Cart	0.94	4.96	5.92	0.02	0.24	0.22
Static Truck	0.32	0.93	2.72	0.00	0.10	0.09
Static Tensioner						
60k Puller	0.71	2.10	6.13	0.01	0.22	0.20
3 Drum Straw Line Puller	1.09	3.19	9.34	0.01	0.34	0.31
580 case backhoe	0.15	0.71	0.98	0.00	0.09	0.08
Sag Cat w2 Cinch	0.68	2.16	6.33	0.01	0.22	0.20
D8 Cat	0.57	1.85	5.42	0.01	0.19	0.17
Total	**8.78**	**31.38**	**86.71**	**0.13**	**2.96**	**2.72**

[a] Emissions [lb/day] = number x hours/day x emission factor [lb/hr]

Construction Equipment Total Greenhouse Gas Emissions

Equipment	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
30 Ton Manitex	40.5	0.0	40.6
22 Ton Manitex	13.5	0.0	13.5
Splicing Rig	8.6	0.0	8.7
Splicing Lab	8.6	0.0	8.7
20,000 lb. Rough Terrain Fork Lift	4.1	0.0	4.1
Spacing Cart	9.2	0.0	9.2
Static Truck	4.3	0.0	4.3
Static Tensioner			
60k Puller	9.7	0.0	9.7
3 Drum Straw Line Puller	14.8	0.0	14.8
580 case backhoe	1.2	0.0	1.2
Sag Cat w2 Cinch	10.9	0.0	11.0
D8 Cat	9.4	0.0	9.4
Total	**134.9**	**0.0**	**135.1**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x hours/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Usage

Vehicle	Number	Days Used	Hours Used/ Day	Miles/ Day/ Veh.
Offsite				
3/4 Ton Pick-Up Truck 4X4	6	25		50
1 Ton Crew Cab Flat Bed, 4x4	5	25		50
Pole Truck & Trailer	1	25		40
Wire Truck & Trailer	6	25		50
Dump Truck (Trash)	1	25		50
Lowboy Truck/Trailer	1	25		10
Worker Commute	32	25		25

Motor Vehicle Exhaust Emission Factors

Vehicle	Category	VOC (lb/mi)[a]	CO (lb/mi)[a]	NOX (lb/mi)[a]	SOX (lb/mi)[a]	PM10 (lb/mi)[a]	PM2.5 (lb/mi)[b]	CO2 (lb/mi)[a]	CH4 (lb/mi)[a]
Offsite									
3/4 Ton Pick-Up Truck 4X4	Delivery	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05
1 Ton Crew Cab Flat Bed, 4x4	Delivery	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05
Pole Truck & Trailer	HHDT	2.00E-03	9.00E-03	2.80E-02	4.00E-05	1.10E-03	1.01E-03	4.50E+00	9.00E-05
Wire Truck & Trailer	HHDT	5.00E-04	2.00E-03	9.00E-03	1.00E-05	1.70E-04	1.56E-04	1.16E+00	2.00E-05
Dump Truck (Trash)	HHDT	5.00E-04	2.00E-03	9.00E-03	1.00E-05	1.70E-04	1.56E-04	1.16E+00	2.00E-05
Lowboy Truck/Trailer	HHDT	2.00E-03	9.00E-03	2.80E-02	4.00E-05	1.10E-03	1.01E-03	4.50E+00	9.00E-05
Worker Commute	Passenger	3.00E-04	7.00E-03	1.00E-03	1.00E-05	9.00E-05	8.37E-05	1.02E+00	7.00E-05

[a] From Table 20

Motor Vehicle Daily Criteria Pollutant Exhaust Emissions

Vehicle	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
Offsite						
3/4 Ton Pick-Up Truck 4X4	0.06	0.30	0.90	0.00	0.05	0.05
1 Ton Crew Cab Flat Bed, 4x4	0.05	0.25	0.75	0.00	0.04	0.04
Pole Truck & Trailer	0.08	0.36	1.12	0.00	0.04	0.04
Wire Truck & Trailer	0.15	0.60	2.70	0.00	0.05	0.05
Dump Truck (Trash)	0.03	0.10	0.45	0.00	0.01	0.01
Lowboy Truck/Trailer	0.02	0.09	0.28	0.00	0.01	0.01
Worker Commute	0.24	5.60	0.80	0.01	0.07	0.07
Offsite Total	**0.63**	**7.30**	**7.00**	**0.02**	**0.28**	**0.26**
Total	**0.63**	**7.30**	**7.00**	**0.02**	**0.28**	**0.26**

[a] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Motor Vehicle Total Greenhouse Gas Emissions

Vehicle	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
Offsite			
3/4 Ton Pick-Up Truck 4X4	2.6	0.0	2.6
1 Ton Crew Cab Flat Bed, 4x4	2.2	0.0	2.2
Pole Truck & Trailer	2.0	0.0	2.0
Wire Truck & Trailer	4.0	0.0	4.0
Dump Truck (Trash)	0.7	0.0	0.7
Lowboy Truck/Trailer	0.5	0.0	0.5
Worker Commute	9.2	0.0	9.2
Offsite Total	**21.2**	**0.0**	**21.2**
Total	**21.2**	**0.0**	**21.2**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x miles/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Fugitive Particulate Matter Emissions

Vehicle	Number	Road Type	Miles/ Day/ Vehicle	PM10 Emission Factor (lb/mi)[a]	PM2.5 Emission Factor (lb/mi)[a]	PM10 Emissions (lb/day)[b]	PM2.5 Emissions (lb/day)[b]
Onsite							
None							
Onsite Total							
Offsite							
3/4 Ton Pick-Up Truck 4X4	6	Unpaved	10	0.140	0.030	8.40	1.77
1 Ton Crew Cab Flat Bed, 4x4	5	Unpaved	10	0.140	0.030	7.00	1.48
Pole Truck & Trailer	1	Unpaved	10	0.140	0.030	1.40	0.30
Wire Truck & Trailer	6	Unpaved	10	0.140	0.030	8.40	1.77
Dump Truck (Trash)	1	Unpaved	10	0.140	0.030	1.40	0.30
Lowboy Truck/Trailer	1	Unpaved	10	0.140	0.030	1.40	0.30
Worker Commute	32	Unpaved	5	0.140	0.030	22.40	4.72
Worker Commute	32	Paved	20	0.001	2.00E-04	0.70	0.13
Offsite Total						**50.40**	**10.62**
Total						**50.40**	**10.62**

[a] From Table 20

[b] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Earthwork Fugitive Particulate Matter Emissions

Activity	Area Disturbed	Units	PM10 Emission Factor[a]	PM2.5 Emission Factor[b]	PM10 (lb/day)[c]	PM2.5 (lb/day)[c]
Install Conductor and OPGW		acre	20.0	4.16		
Total (Uncontrolled)						
Total (Controlled)						

a. PM10 emissions were estimated based on an emission factor of 20 lbs of PM10 per acre per day

b. PM2.5 emissions were estimated using a SCAQMD PM2.5 fraction 0.208 of PM10 for construction fugitive dust

c. Controlled emissions assume a 50% control from watering

Table 15
Construction Emissions
Guard Structure Removal - 2014

Emissions Summary

Source	VOC (lb/day)	CO (lb/day)	NOX (lb/day)	SOX (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2e (MT)
Construction Equipment Exhaust	1.63	6.03	14.27	0.02	0.73	0.67	7.4
Onsite Motor Vehicle Exhaust							
Onsite Motor Vehicle Fugitive PM	--	--	--	--			
Earthwork Fugitive PM	--	--	--	--	4.40	0.92	
Onsite Total	**1.63**	**6.03**	**14.27**	**0.02**	**5.13**	**1.58**	**7.4**
Offsite Motor Vehicle Exhaust	0.14	1.45	1.65	0.00	0.06	0.06	1.9
Offsite Motor Vehicle Fugitive PM	--	--	--	--	12.60	2.66	
Offsite Total	**0.14**	**1.45**	**1.65**	**0.00**	**12.66**	**2.71**	**1.9**
Total	**1.77**	**7.48**	**15.92**	**0.02**	**17.79**	**4.30**	**9.3**
Total Phase (lb/Phase)	**17.69**	**74.76**	**159.20**	**0.22**	**177.91**	**42.98**	
Total Phase (ton/Phase)	**0.01**	**0.04**	**0.08**	**0.00**	**0.09**	**0.02**	

working days 10 days

Construction Equipment Summary

Equipment	Horse-power	Number	Days Used	Hours Used/ Day
80ft. Hydraulic Man-Lift	350	1	10	4
Compressor Trailer	120	2	10	4
30 Ton Crane Truck	500	1	10	6

Construction Equipment Exhaust Emission Factors

Equipment	Horse-power	VOC (lb/hr)[a]	CO (lb/hr)[a]	NOX (lb/hr)[a]	SOX (lb/hr)[a]	PM10 (lb/hr)[a]	PM2.5 (lb/hr)[b]	CO2 (lb/hr)[a]	CH4 (lb/hr)[a]	Category
80ft. Hydraulic Man-Lift	350	0.087	0.341	1.137	0.002	0.034	0.031	148.865	0.008	Aerial Lifts
Compressor Trailer	120	0.087	0.327	0.526	0.001	0.048	0.044	46.908	0.008	Air Compressors
30 Ton Crane Truck	500	0.098	0.341	0.919	0.001	0.034	0.031	107.964	0.008	Cranes

[a] From Table 20

[b] Diesel PM2.5 emission factor [lb/hr] = PM10 emission factor [lb/hr] x PM2.5 fraction of PM10

PM2.5 Fraction= 0.920

From Appendix A, Final–Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds, SCAQMD, October 2006, http://www.aqmd.gov/ceqa/handbook/PM2_5/PM2_5.html

Table 15
Construction Emissions
Guard Structure Removal - 2014

Construction Equipment Daily Criteria Pollutant Exhaust Emission

Equipment	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
80ft. Hydraulic Man-Lift	0.35	1.36	4.55	0.01	0.14	0.12
Compressor Trailer	0.70	2.62	4.21	0.00	0.39	0.36
30 Ton Crane Truck	0.59	2.05	5.51	0.01	0.21	0.19
Total	**1.63**	**6.03**	**14.27**	**0.02**	**0.73**	**0.67**

[a] Emissions [lb/day] = number x hours/day x emission factor [lb/hr]

Construction Equipment Total Greenhouse Gas Emissions

Equipment	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
80ft. Hydraulic Man-Lift	2.7	0.0	2.7
Compressor Trailer	1.7	0.0	1.7
30 Ton Crane Truck	2.9	0.0	2.9
Total	**7.3**	**0.0**	**7.4**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x hours/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Usage

Vehicle	Number	Days Used	Hours Used/ Day	Miles/ Day/ Veh.
Onsite				
None				
Offsite				
1 Ton Crew Cab Flat Bed, 4x4	2	10		50
3/4 Ton Pick-Up Truck 4X4	2	10		50
Extendable Flat Bed Pole Truck	2	10		50
Worker Commute	6	10		25

Table 15
Construction Emissions
Guard Structure Removal - 2014

Motor Vehicle Exhaust Emission Factors

Vehicle	Category	VOC (lb/mi)[a]	CO (lb/mi)[a]	NOX (lb/mi)[a]	SOX (lb/mi)[a]	PM10 (lb/mi)[a]	PM2.5 (lb/mi)[b]	CO2 (lb/mi)[a]	CH4 (lb/mi)[a]
Onsite									
None									
Offsite									
1 Ton Crew Cab Flat Bed, 4x4	Delivery	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05
3/4 Ton Pick-Up Truck 4X4	Delivery	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05
Extendable Flat Bed Pole Truck	HHDT	5.00E-04	2.00E-03	9.00E-03	1.00E-05	1.70E-04	1.56E-04	1.16E+00	2.00E-05
Worker Commute	Passenger	3.00E-04	7.00E-03	1.00E-03	1.00E-05	9.00E-05	8.37E-05	1.02E+00	7.00E-05

[a] From Table 20

Motor Vehicle Daily Criteria Pollutant Exhaust Emissions

Vehicle	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
Onsite						
None						
Onsite Total						
Offsite						
1 Ton Crew Cab Flat Bed, 4x4	0.02	0.10	0.30	0.00	0.02	0.02
3/4 Ton Pick-Up Truck 4X4	0.02	0.10	0.30	0.00	0.02	0.02
Extendable Flat Bed Pole Truck	0.05	0.20	0.90	0.00	0.02	0.02
Worker Commute	0.05	1.05	0.15	0.00	0.01	0.01
Offsite Total	**0.14**	**1.45**	**1.65**	**0.00**	**0.06**	**0.06**
Total	**0.14**	**1.45**	**1.65**	**0.00**	**0.06**	**0.06**

[a] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Table 15
Construction Emissions
Guard Structure Removal - 2014

Motor Vehicle Total Greenhouse Gas Emissions

Vehicle	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
Onsite			
None			
Onsite Total			
Offsite			
1 Ton Crew Cab Flat Bed, 4x4	0.3	0.0	0.3
3/4 Ton Pick-Up Truck 4X4	0.3	0.0	0.3
Extendable Flat Bed Pole Truck	0.5	0.0	0.5
Worker Commute	0.7	0.0	0.7
Offsite Total	**1.9**	**0.0**	**1.9**
Total	**1.9**	**0.0**	**1.9**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x miles/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Fugitive Particulate Matter Emissions

Vehicle	Number	Road Type	Miles/ Day/ Vehicle	PM10 Emission Factor (lb/mi)[a]	PM2.5 Emission Factor (lb/mi)[a]	PM10 Emissions (lb/day)[b]	PM2.5 Emissions (lb/day)[b]
Onsite							
None							
Onsite Total							
Offsite							
1 Ton Crew Cab Flat Bed, 4x4	2	Unpaved	10	0.140	0.030	2.80	0.59
3/4 Ton Pick-Up Truck 4X4	2	Unpaved	10	0.140	0.030	2.80	0.59
Extendable Flat Bed Pole Truck	2	Unpaved	10	0.140	0.030	2.80	0.59
Worker Commute	6	Unpaved	5	0.140	0.030	4.20	0.89
Offsite Total						**12.60**	**2.66**
Total						**12.60**	**2.66**

[a] From Table 20

[b] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Table 15
Construction Emissions
Guard Structure Removal - 2014

Earthwork Fugitive Particulate Matter Emissions

Activity	Area Disturbed	Units	PM10 Emission Factor[a]	PM2.5 Emission Factor[b]	PM10 (lb/day)[c]	PM2.5 (lb/day)[c]
Install Conductor and OPGW	0.44	acre	20.0	4.16	8.80	1.83
Total (Uncontrolled)					8.80	1.83
Total (Controlled)					**4.40**	**0.92**

a. PM10 emissions were estimated based on an emission factor of 20 lbs of PM10 per acre per day

b. PM2.5 emissions were estimated using a SCAQMD PM2.5 fraction 0.208 of PM10 for construction fugitive dust

c. Controlled emissions assume a 50% control from watering

Table 16
Construction Emissions
Restoration - 2013

Emissions Summary

Source	VOC (lb/day)	CO (lb/day)	NOX (lb/day)	SOX (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2e (MT)
Construction Equipment Exhaust	4.74	16.00	45.11	0.06	1.63	1.50	26.6
Onsite Motor Vehicle Exhaust							
Onsite Motor Vehicle Fugitive PM	--	--	--	--			
Earthwork Fugitive PM	--	--	--	--	50.00	10.40	
Onsite Total	**4.74**	**16.00**	**45.11**	**0.06**	**51.63**	**11.90**	**26.6**
Offsite Motor Vehicle Exhaust	0.12	1.52	1.21	0.00	0.05	0.05	1.6
Offsite Motor Vehicle Fugitive PM	--	--	--	--	16.10	3.39	
Offsite Total	**0.12**	**1.52**	**1.21**	**0.00**	**16.15**	**3.44**	**1.6**
Total	**4.86**	**17.51**	**46.32**	**0.07**	**67.79**	**15.34**	**28.3**
Total Phase (lb/Phase)	**48.61**	**175.11**	**463.19**	**0.67**	**677.87**	**153.44**	
Total Phase (ton/Phase)	**0.02**	**0.09**	**0.23**	**0.00**	**0.34**	**0.08**	

working days 10 days

Construction Equipment Summary

Equipment	Horse-power	Number	Days Used	Hours Used/ Day
Road Grader	350	1	10	6
Backhoe	350	1	10	6
Front End Loader	350	1	10	6
Track Type Dozer	350	1	10	6
Drum Type Compactor	250	1	10	6

Construction Equipment Exhaust Emission Factors

Equipment	Horse-power	VOC (lb/hr)[a]	CO (lb/hr)[a]	NOX (lb/hr)[a]	SOX (lb/hr)[a]	PM10 (lb/hr)[a]	PM2.5 (lb/hr)[b]	CO2 (lb/hr)[a]	CH4 (lb/hr)[a]	Category
Road Grader	350	0.136	0.464	1.273	0.002	0.047	0.043	160.495	0.012	Graders
Backhoe	350	0.167	0.540	1.582	0.003	0.055	0.051	241.181	0.015	Tractors/Loaders/Backhoes
Front End Loader	350	0.167	0.540	1.582	0.003	0.055	0.051	241.181	0.015	Tractors/Loaders/Backhoes
Track Type Dozer	350	0.186	0.714	1.673	0.002	0.066	0.061	181.298	0.017	Other Construction Equipment
Drum Type Compactor	250	0.135	0.408	1.409	0.002	0.050	0.046	152.953	0.012	Rollers

[a] From Table 20

[b] Diesel PM2.5 emission factor [lb/hr] = PM10 emission factor [lb/hr] x PM2.5 fraction of PM10

PM2.5 Fraction= 0.920

From Appendix A, Final–Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds, SCAQMD, October 2006, http://www.aqmd.gov/ceqa/handbook/PM2_5/PM2_5.html

Table 16
Construction Emissions
Restoration - 2013

Construction Equipment Daily Criteria Pollutant Exhaust Emission

Equipment	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
Road Grader	0.82	2.78	7.64	0.01	0.28	0.26
Backhoe	1.00	3.24	9.49	0.02	0.33	0.30
Front End Loader	1.00	3.24	9.49	0.02	0.33	0.30
Track Type Dozer	1.12	4.28	10.04	0.01	0.40	0.36
Drum Type Compactor	0.81	2.45	8.45	0.01	0.30	0.27
Total	**4.74**	**16.00**	**45.11**	**0.06**	**1.63**	**1.50**

[a] Emissions [lb/day] = number x hours/day x emission factor [lb/hr]

Construction Equipment Total Greenhouse Gas Emissions

Equipment	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
Road Grader	4.4	0.0	4.4
Backhoe	6.6	0.0	6.6
Front End Loader	6.6	0.0	6.6
Track Type Dozer	4.9	0.0	4.9
Drum Type Compactor	4.2	0.0	4.2
Total	**26.6**	**0.0**	**26.6**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x hours/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Usage

Vehicle	Number[a]	Days Used	Hours Used/ Day	Miles/ Day/ Veh.
Offsite				
Water Truck	1	10		50
Lowboy Truck/Trailer	1	10		10
1 Ton Crew Cab, 4X4	2	10		50
Worker Commute	7	10		25

Table 16
Construction Emissions
Restoration - 2013

Motor Vehicle Exhaust Emission Factors

Vehicle	Category	VOC (lb/mi)[a]	CO (lb/mi)[a]	NOX (lb/mi)[a]	SOX (lb/mi)[a]	PM10 (lb/mi)[a]	PM2.5 (lb/mi)[b]	CO2 (lb/mi)[a]	CH4 (lb/mi)[a]
Offsite									
Water Truck	HHDT	5.00E-04	2.00E-03	9.00E-03	1.00E-05	1.70E-04	1.56E-04	1.16E+00	2.00E-05
Lowboy Truck/Trailer	HHDT	2.00E-03	9.00E-03	2.80E-02	4.00E-05	1.10E-03	1.01E-03	4.50E+00	9.00E-05
1 Ton Crew Cab, 4X4	Delivery	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05
Worker Commute	Passenger	3.00E-04	7.00E-03	1.00E-03	1.00E-05	9.00E-05	8.37E-05	1.02E+00	7.00E-05

[a] From Table 20

Motor Vehicle Daily Criteria Pollutant Exhaust Emissions

Vehicle	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
Offsite						
Water Truck	0.03	0.10	0.45	0.00	0.01	0.01
Lowboy Truck/Trailer	0.02	0.09	0.28	0.00	0.01	0.01
1 Ton Crew Cab, 4X4	0.02	0.10	0.30	0.00	0.02	0.02
Worker Commute	0.05	1.23	0.18	0.00	0.02	0.01
Offsite Total	**0.12**	**1.52**	**1.21**	**0.00**	**0.05**	**0.05**
Total	**0.12**	**1.52**	**1.21**	**0.00**	**0.05**	**0.05**

[a] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Motor Vehicle Total Greenhouse Gas Emissions

Vehicle	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
Offsite			
Water Truck	0.3	0.0	0.3
Lowboy Truck/Trailer	0.2	0.0	0.2
1 Ton Crew Cab, 4X4	0.3	0.0	0.3
Worker Commute	0.8	0.0	0.8
Offsite Total	**1.6**	**0.0**	**1.6**
Total	**1.6**	**0.0**	**1.6**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x miles/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Table 16
Construction Emissions
Restoration - 2013

Motor Vehicle Fugitive Particulate Matter Emissions

Vehicle	Number	Road Type	Miles/ Day/ Vehicle	PM10 Emission Factor (lb/mi)[a]	PM2.5 Emission Factor (lb/mi)[a]	PM10 Emissions (lb/day)[b]	PM2.5 Emissions (lb/day)[b]
Offsite							
Water Truck	1	Unpaved	50	0.140	0.030	7.00	1.48
Lowboy Truck/Trailer	1	Unpaved	10	0.140	0.030	1.40	0.30
1 Ton Crew Cab, 4X4	2	Unpaved	10	0.140	0.030	2.80	0.59
Worker Commute	7	Unpaved	5	0.140	0.030	4.90	1.03
Worker Commute	7	Paved	20	0.001	2.00E-04	0.15	0.03
Offsite Total				**0.56**	**0.12**	**16.10**	**3.39**
Total				**0.56**	**0.12**	**16.10**	**3.39**

[a] From Table 20

[b] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Earthwork Fugitive Particulate Matter Emissions

Activity	Area Disturbed	Units	PM10 Emission Factor[a]	PM2.5 Emission Factor[b]	PM10 (lb/day)[c]	PM2.5 (lb/day)[c]
Restoration	5	acre	20.0	4.16	100.00	20.80
Total (Uncontrolled)					100.00	20.80
Total (Controlled)					**50.00**	**10.40**

a. PM10 emissions were estimated based on an emission factor of 20 lbs of PM10 per acre per day

b. PM2.5 emissions were estimated using a SCAQMD PM2.5 fraction 0.208 of PM10 for construction fugitive dust

c. Controlled emissions assume a 50% control from watering

Table 17
Construction Emissions
Restoration - 2014

Emissions Summary

Source	VOC (lb/day)	CO (lb/day)	NOX (lb/day)	SOX (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2e (MT)
Construction Equipment Exhaust	4.74	16.00	45.11	0.06	1.63	1.50	40.0
Onsite Motor Vehicle Exhaust							
Onsite Motor Vehicle Fugitive PM	--	--	--	--			
Earthwork Fugitive PM	--	--	--	--	50.00	10.40	
Onsite Total	**4.74**	**16.00**	**45.11**	**0.06**	**51.63**	**11.90**	**40.0**
Offsite Motor Vehicle Exhaust	0.12	1.52	1.21	0.00	0.05	0.05	2.4
Offsite Motor Vehicle Fugitive PM	--	--	--	--	16.10	3.39	
Offsite Total	**0.12**	**1.52**	**1.21**	**0.00**	**16.15**	**3.44**	**2.4**
Total	**4.86**	**17.51**	**46.32**	**0.07**	**67.79**	**15.34**	**42.4**
Total Phase (lb/Phase)	**72.92**	**262.67**	**694.79**	**1.00**	**1016.80**	**230.17**	
Total Phase (ton/Phase)	**0.04**	**0.13**	**0.35**	**0.00**	**0.51**	**0.12**	

working days 15 days

Construction Equipment Summary

Equipment	Horse-power	Number	Days Used	Hours Used/ Day
Road Grader	350	1	15	6
Backhoe	350	1	15	6
Front End Loader	350	1	15	6
Track Type Dozer	350	1	15	6
Drum Type Compactor	250	1	15	6

Construction Equipment Exhaust Emission Factors

Equipment	Horse-power	VOC (lb/hr)[a]	CO (lb/hr)[a]	NOX (lb/hr)[a]	SOX (lb/hr)[a]	PM10 (lb/hr)[a]	PM2.5 (lb/hr)[b]	CO2 (lb/hr)[a]	CH4 (lb/hr)[a]	Category
Road Grader	350	0.136	0.464	1.273	0.002	0.047	0.043	160.495	0.012	Graders
Backhoe	350	0.167	0.540	1.582	0.003	0.055	0.051	241.181	0.015	Tractors/Loaders/Backhoes
Front End Loader	350	0.167	0.540	1.582	0.003	0.055	0.051	241.181	0.015	Tractors/Loaders/Backhoes
Track Type Dozer	350	0.186	0.714	1.673	0.002	0.066	0.061	181.298	0.017	Other Construction Equipment
Drum Type Compactor	250	0.135	0.408	1.409	0.002	0.050	0.046	152.953	0.012	Rollers

[a] From Table 20

[b] Diesel PM2.5 emission factor [lb/hr] = PM10 emission factor [lb/hr] x PM2.5 fraction of PM10

PM2.5 Fraction= 0.920

From Appendix A, Final–Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds, SCAQMD, October 2006, http://www.aqmd.gov/ceqa/handbook/PM2_5/PM2_5.html

Table 17
Construction Emissions
Restoration - 2014

Construction Equipment Daily Criteria Pollutant Exhaust Emission

Equipment	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
Road Grader	0.82	2.78	7.64	0.01	0.28	0.26
Backhoe	1.00	3.24	9.49	0.02	0.33	0.30
Front End Loader	1.00	3.24	9.49	0.02	0.33	0.30
Track Type Dozer	1.12	4.28	10.04	0.01	0.40	0.36
Drum Type Compactor	0.81	2.45	8.45	0.01	0.30	0.27
Total	**4.74**	**16.00**	**45.11**	**0.06**	**1.63**	**1.50**

[a] Emissions [lb/day] = number x hours/day x emission factor [lb/hr]

Construction Equipment Total Greenhouse Gas Emissions

Equipment	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
Road Grader	6.6	0.0	6.6
Backhoe	9.8	0.0	9.9
Front End Loader	9.8	0.0	9.9
Track Type Dozer	7.4	0.0	7.4
Drum Type Compactor	6.2	0.0	6.3
Total	**39.9**	**0.0**	**40.0**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x hours/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Motor Vehicle Usage

Vehicle	Number[a]	Days Used	Hours Used/ Day	Miles/ Day/ Veh.
Offsite				
Water Truck	1	15		50
Lowboy Truck/Trailer	1	15		10
1 Ton Crew Cab, 4X4	2	15		50
Worker Commute	7	15		25

Table 17
Construction Emissions
Restoration - 2014

Motor Vehicle Exhaust Emission Factors

Vehicle	Category	VOC (lb/mi)[a]	CO (lb/mi)[a]	NOX (lb/mi)[a]	SOX (lb/mi)[a]	PM10 (lb/mi)[a]	PM2.5 (lb/mi)[b]	CO2 (lb/mi)[a]	CH4 (lb/mi)[a]
Onsite									
None									
Offsite									
Water Truck	HHDT	5.00E-04	2.00E-03	9.00E-03	1.00E-05	1.70E-04	1.56E-04	1.16E+00	2.00E-05
Lowboy Truck/Trailer	HHDT	2.00E-03	9.00E-03	2.80E-02	4.00E-05	1.10E-03	1.01E-03	4.50E+00	9.00E-05
1 Ton Crew Cab, 4X4	Delivery	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05
Worker Commute	Passenger	3.00E-04	7.00E-03	1.00E-03	1.00E-05	9.00E-05	8.37E-05	1.02E+00	7.00E-05

[a] From Table 20

Motor Vehicle Daily Criteria Pollutant Exhaust Emissions

Vehicle	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
Offsite						
Water Truck	0.03	0.10	0.45	0.00	0.01	0.01
Lowboy Truck/Trailer	0.02	0.09	0.28	0.00	0.01	0.01
1 Ton Crew Cab, 4X4	0.02	0.10	0.30	0.00	0.02	0.02
Worker Commute	0.05	1.23	0.18	0.00	0.02	0.01
Offsite Total	**0.12**	**1.52**	**1.21**	**0.00**	**0.05**	**0.05**
Total	**0.12**	**1.52**	**1.21**	**0.00**	**0.05**	**0.05**

[a] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Motor Vehicle Total Greenhouse Gas Emissions

Vehicle	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
Offsite			
Water Truck	0.4	0.0	0.4
Lowboy Truck/Trailer	0.3	0.0	0.3
1 Ton Crew Cab, 4X4	0.5	0.0	0.5
Worker Commute	1.2	0.0	1.2
Offsite Total	**2.4**	**0.0**	**2.4**
Total	**2.4**	**0.0**	**2.4**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x miles/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Table 17
Construction Emissions
Restoration - 2014

Motor Vehicle Fugitive Particulate Matter Emissions

Vehicle	Number	Road Type	Miles/ Day/ Vehicle	PM10 Emission Factor (lb/mi)[a]	PM2.5 Emission Factor (lb/mi)[a]	PM10 Emissions (lb/day)[b]	PM2.5 Emissions (lb/day)[b]
Offsite							
Water Truck	1	Unpaved	50	0.140	0.030	7.00	1.48
Lowboy Truck/Trailer	1	Unpaved	10	0.140	0.030	1.40	0.30
1 Ton Crew Cab, 4X4	2	Unpaved	10	0.140	0.030	2.80	0.59
Worker Commute	7	Unpaved	5	0.140	0.030	4.90	1.03
Worker Commute	7	Paved	20	0.001	2.00E-04	0.15	0.03
Offsite Total				**0.56**	**0.12**	**16.10**	**3.39**
Total				**0.56**	**0.12**	**16.10**	**3.39**

[a] From Table 20

[b] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Earthwork Fugitive Particulate Matter Emissions

Activity	Area Disturbed	Units	PM10 Emission Factor[a]	PM2.5 Emission Factor[b]	PM10 (lb/day)[c]	PM2.5 (lb/day)[c]
Restoration	5	acre	20.0	4.16	100.00	20.80
Total (Uncontrolled)					100.00	20.80
Total (Controlled)					**50.00**	**10.40**

a. PM10 emissions were estimated based on an emission factor of 20 lbs of PM10 per acre per day

b. PM2.5 emissions were estimated using a SCAQMD PM2.5 fraction 0.208 of PM10 for construction fugitive dust

c. Controlled emissions assume a 50% control from watering

Table 18
Subtransmission Source Line Construction Emissions
Helicopter Use - 2013

Emissions Summary

Source	VOC (lb/day)	CO (lb/day)	NOX (lb/day)	SOX (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2e (MT)
Construction Equipment Exhaust	1.81	6.84	22.48	0.02	0.70	0.64	183.9
Onsite Motor Vehicle Exhaust							
Onsite Motor Vehicle Fugitive PM	--	--	--	--			
Earthwork Fugitive PM	--	--	--	--			
Onsite Total	**1.81**	**6.84**	**22.48**	**0.02**	**0.70**	**0.64**	**183.9**
Offsite Motor Vehicle Exhaust	0.01	0.05	0.15	0.00	0.01	0.01	1.7
Offsite Motor Vehicle Fugitive PM	--	--	--	--	1.40	0.30	
Offsite Total	**0.01**	**0.05**	**0.15**	**0.00**	**1.41**	**0.30**	**1.7**
Total	**1.82**	**6.89**	**22.63**	**0.02**	**2.10**	**0.94**	**185.7**
Total Phase (lb/Phase)	**181.60**	**689.00**	**2263.20**	**2.45**	**210.45**	**94.31**	
Total Phase (ton/Phase)	**0.09**	**0.34**	**1.13**	**0.00**	**0.11**	**0.05**	

# of working days	80 days		
helicopter use	100 days per year	200 days total	
	600 hours per year	1200 hours total	

Construction Equipment Summary

Equipment	Horse-power	Number	Days Used	Hours Used/ Day
Hughes 500 E Helicopter	300	1	100	6

Table 18
Subtransmission Source Line Construction Emissions
Helicopter Use - 2013

Construction Equipment Exhaust Emission Factors

Equipment	Horse-power	VOC (lb/hr)[a]	CO (lb/hr)[a]	NOX (lb/hr)[a]	SOX (lb/hr)[a]	PM10 (lb/hr)[a]	PM2.5 (lb/hr)[b]	CO2 (lb/hr)[a]	CH4 (lb/hr)[a]	Category
Hughes 500 E Helicopter	300	0.301	1.140	3.747	0.004	0.116	0.107	675.793		See note c

[a] From Table 20

[b] Diesel PM2.5 emission factor [lb/hr] = PM10 emission factor [lb/hr] x PM2.5 fraction of PM10

PM2.5 Fraction= 0.920

From Appendix A, Final–Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds, SCAQMD, October 2006, http://www.aqmd.gov/ceqa/handbook/PM2_5/PM2_5.html

[c] All except SOx, PM2.5 and CO2 from Guidance on the Determination of Helicopter Emissions, Federal Department of the Environment, Transport, Energy and Communications, DETEC, Federal Office of Civil Aviation FOCA, Division Aviation Policy and Strategy, Swiss Confederation, March 2009. Downloaded from http://www.bazl.admin.ch/experten/regulation/03312/03419/03532/index.html?lang=en

PM2.5 emissions assumed equal to PM10

SOx emissions [lb/hr] = Fuel use [kg/hr] x 1000 [g/kg] / 453.6 [g/lb] x Fuel sulfur [wt. %] / 100 x 2 [lb SO2/lbS]

Fuel use = 98.8 kg/hr from Guidance on the Determination of Helicopter Emissions

Fuel sulfur = 0.3% from ASTM D-1655 for Jet-A

CO2 emissions [lb/hr] = CO2 emission factor [kg/gal] x 1000 [g/kg] / 453.6 [g/lb] x Fuel use [kg/hr] x 1000 [g/kg] / 453.6 [g/lb] / Fuel density [lb/gal]

CO2 emission factor = 9.57 kg/gal from Table C.3 from California Climate Action Registry General Reporting Protocol, Version 3.0, April 2008. Downloaded from http://www.climateregistry.org/resources/docs/protocols/grp/GRP_V3_April2008_FINAL.pdf

Fuel use = 98.8 kg/hr from Guidance on the Determination of Helicopter Emissions

Jet-A density = 6.8 lb/gal

Construction Equipment Daily Criteria Pollutant Exhaust Emissions

Equipment	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
Hughes 500 E Helicopter	1.81	6.84	22.48	0.02	0.70	0.64
Total	**1.81**	**6.84**	**22.48**	**0.02**	**0.70**	**0.64**

[a] Emissions [lb/day] = number x hours/day x emission factor [lb/hr]

Construction Equipment Total Greenhouse Gas Emissions

Equipment	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
Hughes 500 E Helicopter	183.9		183.9
Total	**183.9**		**183.9**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x hours/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Table 18
Subtransmission Source Line Construction Emissions
Helicopter Use - 2013

Motor Vehicle Usage

Vehicle	Number	Days Used	Hours Used/ Day	Miles/ Day/ Veh.
Offsite				
Fuel, Helicopter Support Truck	1	100		50

Motor Vehicle Exhaust Emission Factors

Vehicle	Category	VOC (lb/mi)[a]	CO (lb/mi)[a]	NOX (lb/mi)[a]	SOX (lb/mi)[a]	PM10 (lb/mi)[a]	PM2.5 (lb/mi)[b]	CO2 (lb/mi)[a]	CH4 (lb/mi)[a]
Offsite									
Fuel, Helicopter Support Truck	HHDT	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05

[a] From Table 20

Motor Vehicle Daily Criteria Pollutant Exhaust Emissions

Vehicle	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
Offsite						
Fuel, Helicopter Support Truck	0.01	0.05	0.15	0.00	0.01	0.01
Offsite Total	**0.01**	**0.05**	**0.15**	**0.00**	**0.01**	**0.01**
Total	**0.01**	**0.05**	**0.15**	**0.00**	**0.01**	**0.01**

[a] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Motor Vehicle Total Greenhouse Gas Emissions

Vehicle	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
Offsite			
Fuel, Helicopter Support Truck	1.7	0.0	1.7
Offsite Total	**1.7**	**0.0**	**1.7**
Total	**1.7**	**0.0**	**1.7**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x miles/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Table 18
Subtransmission Source Line Construction Emissions
Helicopter Use - 2013

Motor Vehicle Fugitive Particulate Matter Emissions

Vehicle	Number	Road Type	Miles/ Day/ Vehicle	PM10 Emission Factor (lb/mi)[a]	PM2.5 Emission Factor (lb/mi)[a]	PM10 Emissions (lb/day)[b]	PM2.5 Emissions (lb/day)[b]
Offsite							
Fuel, Helicopter Support Truck	1	Unpaved	10	0.140	0.030	1.40	0.30
Offsite Total						**1.40**	**0.30**
Total						**1.40**	**0.30**

[a] From Table 20

[b] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Table 19
Subtransmission Source Line Construction Emissions
Helicopter Use - 2014

Emissions Summary

Source	VOC (lb/day)	CO (lb/day)	NOX (lb/day)	SOX (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2e (MT)
Construction Equipment Exhaust	1.81	6.84	22.48	0.02	0.70	0.64	183.9
Onsite Motor Vehicle Exhaust							
Onsite Motor Vehicle Fugitive PM	--	--	--	--			
Earthwork Fugitive PM	--	--	--	--			
Onsite Total	**1.81**	**6.84**	**22.48**	**0.02**	**0.70**	**0.64**	**183.9**
Offsite Motor Vehicle Exhaust	0.01	0.05	0.15	0.00	0.01	0.01	1.7
Offsite Motor Vehicle Fugitive PM	--	--	--	--	1.40	0.30	
Offsite Total	**0.01**	**0.05**	**0.15**	**0.00**	**1.41**	**0.30**	**1.7**
Total	**1.82**	**6.89**	**22.63**	**0.02**	**2.10**	**0.94**	**185.7**
Total Phase (lb/Phase)	**181.60**	**689.00**	**2263.20**	**2.45**	**210.45**	**94.31**	
Total Phase (ton/Phase)	**0.09**	**0.34**	**1.13**	**0.00**	**0.11**	**0.05**	

# working days	80 days		
helicopter use	100 days per year	200 days total	
	600 hours per year	1200 hours total	

Construction Equipment Summary

Equipment	Horse-power	Number	Days Used	Hours Used/ Day
Hughes 500 E Helicopter	300	1	100	6

Table 19
Subtransmission Source Line Construction Emissions
Helicopter Use - 2014

Construction Equipment Exhaust Emission Factors

Equipment	Horse-power	VOC (lb/hr)[a]	CO (lb/hr)[a]	NOX (lb/hr)[a]	SOX (lb/hr)[a]	PM10 (lb/hr)[a]	PM2.5 (lb/hr)[b]	CO2 (lb/hr)[a]	CH4 (lb/hr)[a]	Category
Hughes 500 E Helicopter	300	0.301	1.140	3.747	0.004	0.116	0.107	675.793		See note c

[a] From Table 20

[b] Diesel PM2.5 emission factor [lb/hr] = PM10 emission factor [lb/hr] x PM2.5 fraction of PM10

PM2.5 Fraction= 0.920

From Appendix A, Final–Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds, SCAQMD, October 2006, http://www.aqmd.gov/ceqa/handbook/PM2_5/PM2_5.html

[c] All except SOx, PM2.5 and CO2 from Guidance on the Determination of Helicopter Emissions, Federal Department of the Environment, Transport, Energy and Communications, DETEC, Federal Office of Civil Aviation FOCA, Division Aviation Policy and Strategy, Swiss Confederation, March 2009. Downloaded from http://www.bazl.admin.ch/experten/regulation/03312/03419/03532/index.html?lang=en

PM2.5 emissions assumed equal to PM10

SOx emissions [lb/hr] = Fuel use [kg/hr] x 1000 [g/kg] / 453.6 [g/lb] x Fuel sulfur [wt. %] / 100 x 2 [lb SO2/lbS]

Fuel use = 98.8 kg/hr from Guidance on the Determination of Helicopter Emissions

Fuel sulfur = 0.3% from ASTM D-1655 for Jet-A

CO2 emissions [lb/hr] = CO2 emission factor [kg/gal] x 1000 [g/kg] / 453.6 [g/lb] x Fuel use [kg/hr] x 1000 [g/kg] / 453.6 [g/lb] / Fuel density [lb/gal]

CO2 emission factor = 9.57 kg/gal from Table C.3 from California Climate Action Registry General Reporting Protocol, Version 3.0, April 2008. Downloaded from http://www.climateregistry.org/resources/docs/protocols/grp/GRP_V3_April2008_FINAL.pdf

Fuel use = 98.8 kg/hr from Guidance on the Determination of Helicopter Emissions

Jet-A density = 6.8 lb/gal

Construction Equipment Daily Criteria Pollutant Exhaust Emissions

Equipment	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
Hughes 500 E Helicopter	1.81	6.84	22.48	0.02	0.70	0.64
Total	**1.81**	**6.84**	**22.48**	**0.02**	**0.70**	**0.64**

[a] Emissions [lb/day] = number x hours/day x emission factor [lb/hr]

Construction Equipment Total Greenhouse Gas Emissions

Equipment	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
Hughes 500 E Helicopter	183.9		183.9
Total	**183.9**		**183.9**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x hours/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Table 19
Subtransmission Source Line Construction Emissions
Helicopter Use - 2014

Motor Vehicle Usage

Vehicle	Number	Days Used	Hours Used/ Day	Miles/ Day/ Veh.
Offsite				
Fuel, Helicopter Support Truck	1	100		50

Motor Vehicle Exhaust Emission Factors

Vehicle	Category	VOC (lb/mi)[a]	CO (lb/mi)[a]	NOX (lb/mi)[a]	SOX (lb/mi)[a]	PM10 (lb/mi)[a]	PM2.5 (lb/mi)[b]	CO2 (lb/mi)[a]	CH4 (lb/mi)[a]
Offsite									
Fuel, Helicopter Support Truck	HHDT	2.00E-04	1.00E-03	3.00E-03	1.00E-05	1.70E-04	1.56E-04	7.66E-01	1.00E-05

[a] From Table 20

Motor Vehicle Daily Criteria Pollutant Exhaust Emissions

Vehicle	VOC (lb/day)[a]	CO (lb/day)[a]	NOX (lb/day)[a]	SOX (lb/day)[a]	PM10 (lb/day)[a]	PM2.5 (lb/day)[a]
Offsite						
Fuel, Helicopter Support Truck	0.01	0.05	0.15	0.00	0.01	0.01
Offsite Total	**0.01**	**0.05**	**0.15**	**0.00**	**0.01**	**0.01**
Total	**0.01**	**0.05**	**0.15**	**0.00**	**0.01**	**0.01**

[a] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Motor Vehicle Total Greenhouse Gas Emissions

Vehicle	CO2 (MT)[a]	CH4 (MT)[a]	CO2e (MT)[b]
Offsite			
Fuel, Helicopter Support Truck	1.7	0.0	1.7
Offsite Total	**1.7**	**0.0**	**1.7**
Total	**1.7**	**0.0**	**1.7**

[a] Emissions [metric tons, MT] = emission factor [lb/hr] x miles/day x Number x days used x 453.6 [g/lb] / 1,000,000 [g/MT]

[b] CO_2-equivalent (CO_2e) emission factors are CO_2 emissions plus 21 x CH_4 emissions, based on Table B.1 from The Climate Registry General Reporting Protocol, Version 2.0, March 2013, http://www.theclimateregistry.org/downloads/2013/03/TCR_GRP_Version_2.0.pdf

Table 19
Subtransmission Source Line Construction Emissions
Helicopter Use - 2014

Motor Vehicle Fugitive Particulate Matter Emissions

Vehicle	Number	Road Type	Miles/ Day/ Vehicle	PM10 Emission Factor (lb/mi)[a]	PM2.5 Emission Factor (lb/mi)[a]	PM10 Emissions (lb/day)[b]	PM2.5 Emissions (lb/day)[b]
Offsite							
Fuel, Helicopter Support Truck	1	Unpaved	10	0.140	0.030	1.40	0.30
Offsite Total						**1.40**	**0.30**
Total						**1.40**	**0.30**

[a] From Table 20

[b] Emissions [lb/day] = number x miles/day x emission factor [lb/mi]

Table 20

Emission Factors utilized in the SJXVL DEIR

Work Activity	Emission Factor from Construction Equipment										
Primary Equipment Description	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**	**PM2.5 fraction**	**CO2**	**CH4**	**Estimated Horse-Power**	**Probable Fuel Type**
1 Ton Crew Cab, 4X4	0.0002	0.001	0.003	0.00001	0.00017	0.00016	0.92	0.766	0.00001	300	Diesel
1 Ton Crew Cab Flat Bed, 4X4	0.0002	0.001	0.003	0.00001	0.00017		0.92	0.766	0.00001	300	Diesel
1/2 Ton Pick-Up Truck, 4X4	0.0002	0.008	0.001	0.00001	0.00011	0.00010	0.93	1.067	0.00008	200	Gas
10 cu. Yd. Concrete Mixer Truck	0.0006	0.005	0.015	0.00003	0.00075	0.00069	0.92	3.318	0.00003	425	Diesel
10 Cubic Yard Dump Truck	0.0005	0.002	0.009	0.00001	0.00017	0.00016	0.92	1.164	0.00002	350	Diesel
10,000 lb Rough Terrain Fork Lift	0.1082	0.311	1.126	0.0015	0.0366	0.0337	0.92	136.515	0.0098	200	Diesel
180 Ton Rough Terrain Crane	0.1633	0.569	1.531	0.0018	0.0570	0.0524	0.92	179.940	0.0147	500	Diesel
20,000 lb. Rough Terrain Fork Lift	0.1325	0.419	1.299	0.0018	0.0449	0.0413	0.92	179.438	0.012	350	Diesel
22 Ton Manitex	0.0872	0.341	1.137	0.0015	0.0338	0.0311	0.92	148.865	0.0079	350	Diesel
3 Drum Straw Line Puller	0.1357	0.399	1.167	0.0016	0.0423	0.0389	0.92	163.254	0.0122	300	Diesel
3/4 Ton Pick-Up Truck 4X4	0.0002	0.001	0.003	0.00001	0.00017	0.00016	0.92	0.766	0.00001	300	Diesel
30 Ton Crane Truck	0.098	0.341	0.919	0.0011	0.0342	0.0315	0.92	107.964	0.008	300	Diesel
30-ton Crane Truck	0.1633	0.569	1.531	0.0018	0.0570	0.0524	0.92	179.940	0.0147	500	Diesel
30 Ton Manitex	0.0872	0.341	1.137	0.0015	0.0338	0.0311	0.92	148.865	0.0079	350	Diesel
4,000 Gallon Water Truck	0.0005	0.002	0.009	0.00001	0.00017	0.00016	0.92	1.164	0.00002	350	Diesel
40' Flat Bed Trailer	0.0005	0.002	0.009	0.00001	0.00017	0.00016	0.92	1.164	0.00002	350	Diesel
40' Flat Bed Truck & Trailer	0.0005	0.002	0.009	0.00001	0.00017	0.00016	0.92	1.164	0.00002	350	Diesel
580 Case Backhoe	0.076	0.355	0.491	0.0006	0.0430	0.0396	0.92	51.682	0.0069	120	Diesel
60k Puller	0.2374	0.699	2.042	0.0028	0.0740	0.0681	0.92	285.694	0.0214	525	Diesel
80 Ton Rough Terrain Crane	0.1143	0.398	1.072	0.0012	0.0399	0.0367	0.92	125.958	0.0103	350	Diesel
80ft. Hydraulic Man-Lift	0.0872	0.341	1.137	0.0015	0.0338	0.0311	0.92	148.865	0.0079	350	Diesel
Auger Truck	0.1352	0.552	1.314	0.0031	0.0436	0.0401	0.92	311.029	0.0122	500	Diesel
Backhoe	0.1669	0.54	1.582	0.0027	0.0549	0.0505	0.92	241.181	0.0151	350	Diesel
Backhoe/ Front Loader	0.1011	0.3	1.024	0.0015	0.0332	0.0305	0.92	137.266	0.0091	200	Diesel
Backhoe/Front Loader	0.1669	0.54	1.582	0.0027	0.0549	0.0505	0.92	241.181	0.0151	350	Diesel
Bull Wheel Puller	0.2261	0.665	1.945	0.0027	0.0705	0.0649	0.92	272.089	0.0204	500	Diesel

Table 20

Emission Factors utilized in the SJXVL DEIR

Work Activity	Emission Factor from Construction Equipment										
Primary Equipment Description	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**	**PM2.5 fraction**	**CO2**	**CH4**	**Estimated Horse-Power**	**Probable Fuel Type**
Compressor	0.0872	0.327	0.526	0.0006	0.0483	0.0444	0.92	46.908	0.0079	120	Diesel
Compressor Trailer	0.0872	0.327	0.526	0.0006	0.0483	0.0444	0.92	46.908	0.0079	120	Diesel
Compressor Trailer	0.2543	0.954	1.535	0.0016	0.1409	0.1296	0.92	136.815	0.0229	350	Diesel
Compressor Truck	0.218	0.817	1.315	0.001	0.1210	0.1113	0.92	117.270	0.02	300	Diesel
D8 Cat	0.1431	0.462	1.356	0.0023	0.0470	0.0432	0.92	206.726	0.0129	300	Diesel
Drum Type Compactor	0.1346	0.408	1.409	0.0017	0.0498	0.0458	0.92	152.953	0.0121	250	Diesel
Dump Truck (Trash)	0.0005	0.002	0.009	0.00001	0.00017	0.00016	0.92	1.164	0.00002	350	Diesel
Excavator	0.1082	0.329	0.966	0.0014	0.0344	0.0316	0.92	140.115	0.0098	300	Diesel
Extendable Flat Bed Pole Truck	0.1583	0.466	1.361	0.0019	0.0493	0.0454	0.92	190.463	0.0143	350	Diesel
Extendable Flat Bed Pole Truck	0.0005	0.002	0.009	0.00001	0.00017	0.00016	0.92	1.164	0.00002	350	Diesel
Flat Bed Truck & Trailer	0.0005	0.002	0.009	0.00001	0.00017	0.00016	0.92	1.164	0.00002	350	Diesel
Front End Loader	0.1669	0.54	1.582	0.0027	0.0549	0.0505	0.92	241.181	0.0151	350	Diesel
Fuel, Helicopter Support Truck	0.0002	0.001	0.003	0.00001	0.00017	0.00016	0.92	0.766	0.00001	300	Diesel
Hughes 500 E Helicopter	0.301	1.14	3.747	0.004	0.1160	0.1067	0.92	384.000			Jet A
Hydraulic Rewind Puller	0.1357	0.399	1.167	0.0016	0.0423	0.0389	0.92	163.254	0.0122	300	Diesel
Lowboy Truck/Trailer	0.002	0.009	0.028	0.00004	0.0011	0.0010	0.92	4.503	0.00009	500	Diesel
Pole Truck & Trailer	0.002	0.009	0.028	0.00004	0.0011	0.0010	0.92	4.503	0.00009	500	Diesel
Road Grader	0.1362	0.464	1.273	0.0016	0.0469	0.0431	0.92	160.495	0.0123	350	Diesel
Rough Terrain Forklift	0.1082	0.311	1.126	0.0015	0.0366	0.0337	0.92	136.515	0.0098	200	Diesel
Sag Cat w2 Cinch	0.170	0.540	1.582	0.003	0.0549	0.0505	0.92	241.181	0.0151	350	Diesel
Sleeving Truck	0.1357	0.399	1.167	0.0016	0.0423	0.0389	0.92	163.254	0.0122	300	Diesel
Small Loader	0.0317	0.148	0.205	0.0003	0.0180	0.0166	0.92	21.534	0.0029	50	Diesel
Spacing Cart	0.0118	0.062	0.074	0.0002	0.0030	0.0028	0.92	10.100	0.0011	10	Diesel
Splicing Lab	0.1583	0.466	1.361	0.0019	0.0493	0.0454	0.92	190.463	0.0143	300	Diesel
Splicing Rig	0.1583	0.466	1.361	0.0019	0.0493	0.0454	0.92	190.463	0.0143	350	Diesel
Static Tensioner											Diesel
Static Truck	0.1583	0.466	1.361	0.0019	0.0493	0.0454	0.92	190.463	0.0143	350	Diesel

Table 20

Emission Factors utilized in the SJXVL DEIR

Work Activity	Emission Factor from Construction Equipment										
Primary Equipment Description	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**	**PM2.5 fraction**	**CO2**	**CH4**	**Estimated Horse-Power**	**Probable Fuel Type**
Support Truck	0.0002	0.001	0.003	0.00001	0.00017	0.00016	0.92	0.766	0.00001	300	Diesel
Track Type Dozer	0.186	0.714	1.673	0.0018	0.0659	0.0606	0.92	181.298	0.0168	350	Diesel
Truck, Semi, Tractor	0.0005	0.002	0.009	0.00001	0.00017	0.00016	0.92	1.164	0.00002	350	Diesel
Water Truck	0.0005	0.002	0.009	0.00001	0.00017	0.00016	0.92	1.164	0.00002	350	Diesel
Wire Truck & Trailer	0.0005	0.002	0.009	0.00001	0.00017	0.00016	0.92	1.164	0.00002	350	Diesel
Worker Commute	0.0003	0.007	0.001	0.00001	0.00009	0.00008	0.93	1.016	0.00007		

Emission Factors from DEIR Appendix E

Equipment mix and activity duration based on information provided in Chapter 2, Project Description

Emission factors for all off-road equipment derived from CARBs OFFROAD2007 model. The 2012 Tulare County fleet was assumed. Exhaust emission factor units are lb/hr.

Emission factors for commute and on-road trips were derived from CARB's EMFAC2007 model. Trip distances were provided by SCE. Exhaust emission factor units are lb/mile.

PM2.5 fractions of PM10 were obtained from SCAQMD, 2006.

Proposed project spans 18.5 miles in length

Alternative 2 is 4.5 miles longer than proposed project, resulting in total distance of 23 miles

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Air Impact Assessment

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

OCT 10 2011

Ellice Lin
Southern California Edison
1218 South Fifth Avenue
Monrovia, CA 91016

Re: Air Impact Assessment (AIA) Application Approval
ISR Project Number: C20110147
Land Use Agency: None
Land Use Agency ID Number: None

Dear Ms. Lin:

The San Joaquin Air Pollution Control District (District) has approved your Air Impact Assessment (AIA) for the San Joaquin Cross-Valley Loop Transmission project, located in Visalia, California. Based on the information provided in the AIA application, the District has determined that construction equipment will achieve a 20% reduction of NOx and 45% reduction of PM10 as required per District Rule 9510 section 6.1.1. As such, the District has determined that this project complies with the emission reduction requirements of District Rule 9510 and is not subject to payment of off-site mitigation fees. The determination is based on the project construction details provided with the application. Changes in the construction details may result in increased project related emissions and may necessitate payment of off-site mitigation fees.

Pursuant to District Rule 9510, Section 8.4, the District is providing you with the following information:

- A notification of AIA approval (this letter)
- A statement of tentative rule compliance (this letter)
- A summary of project emissions and emission reductions
- An approved Monitoring and Reporting Schedule

Seyed Sadredin
Executive Director/Air Pollution Control Officer

Northern Region
4800 Enterprise Way
Modesto, CA 95356-8718
Tel: (209) 557-6400 FAX: (209) 557-6475

Central Region (Main Office)
1990 E. Gettysburg Avenue
Fresno, CA 93726-0244
Tel: (559) 230-6000 FAX: (559) 230-6061

Southern Region
34946 Flyover Court
Bakersfield, CA 93308-9725
Tel: 661-392-5500 FAX: 661-392-5585

www.valleyair.org www.healthyairliving.com

If all or a portion of the project changes ownership, a completed Change in Developer form must be submitted to the District within thirty (30) days following the date of transfer.

Thank you for your cooperation in this matter. If you have any questions, please contact Mark Montelongo at (559) 230-5905.

Sincerely,

David Warner
Director of Permit Services

for Daniel T. Barba
Arnaud Marjollet
Permit Services Manager

DW:mm

Enclosures

Off-site Emissions Estimator Worksheet

Applicant/Business Name:	Southern California Edision
Project Name:	San Joaquin Cross-Valley Loop Transmission Project
Project Location:	Northwestern Tulare County
District Project ID No.:	20110147

Project Construction Emissions

		NOx				PM10			
Phase	Construction Start Date	Unmitigated Baseline (TPY)	Mitigated Baseline (TPY)	Achieved Onsite Reductions (tons)	Required Offsite Reductions (tons)	Unmitigated Baseline (TPY)	Mitigated Baseline (TPY)	Achieved Onsite Reductions (tons)	Required Offsite Reductions (tons)
1	11/1/2011	2.6080	2.0864	0.5216	0.0000	0.1680	0.0924	0.0756	0.0000
2	1/1/2012	15.6480	12.5184	3.1296	0.0000	1.0080	0.5544	0.4536	0.0000
3	1/1/2013	14.3440	11.4752	2.8688	0.0000	0.9240	0.5082	0.4158	0.0000
4				0.0000	0.0000			0.0000	0.0000
5				0.0000	0.0000			0.0000	0.0000
6				0.0000	0.0000			0.0000	0.0000
7				0.0000	0.0000			0.0000	0.0000
8				0.0000	0.0000			0.0000	0.0000
9				0.0000	0.0000			0.0000	0.0000
10				0.0000	0.0000			0.0000	0.0000
	Total	32.6000	26.0800	6.5200	0.0000	2.1000	1.1550	0.9450	0.0000

Total Achieved On-Site Reductions (tons)

Phase	NOx	PM10
1	0.5216	0.0756
2	3.1296	0.4536
3	2.8688	0.4158
4	0.0000	0.0000
5	0.0000	0.0000
6	0.0000	0.0000
7	0.0000	0.0000
8	0.0000	0.0000
9	0.0000	0.0000
10	0.0000	0.0000
Total	6.5200	0.9450

Project Operations Emissions (Area + Mobile)

		NOx				PM10			
Phase	Operation Start Date	Unmitigated Baseline (TPY)	Mitigated Baseline (TPY)	Achieved Onsite Reductions (tons)	Required Offsite Reductions (tons)	Unmitigated Baseline (TPY)	Mitigated Baseline (TPY)	Achieved Onsite Reductions (tons)	Required Offsite Reductions (tons)
1				0.0000	0.0000			0.0000	0.0000
2				0.0000	0.0000			0.0000	0.0000
3				0.0000	0.0000			0.0000	0.0000
4				0.0000	0.0000			0.0000	0.0000
5				0.0000	0.0000			0.0000	0.0000
6				0.0000	0.0000			0.0000	0.0000
7				0.0000	0.0000			0.0000	0.0000
8				0.0000	0.0000			0.0000	0.0000
9				0.0000	0.0000			0.0000	0.0000
10				0.0000	0.0000			0.0000	0.0000
	Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Total Required Off-Site Reductions (tons)

Phase	NOx	PM10
1	0.0000	0.0000
2	0.0000	0.0000
3	0.0000	0.0000
4	0.0000	0.0000
5	0.0000	0.0000
6	0.0000	0.0000
7	0.0000	0.0000
8	0.0000	0.0000
9	0.0000	0.0000
10	0.0000	0.0000
Total	0.0000	0.0000

Note: TPY = Tons Per Year

Fee Estimator Worksheet

Applicant/Business Name:	Southern California Edision
Project Name:	San Joaquin Cross-Valley Loop Transmission Project
Project Location:	Northwestern Tulare County
District Project ID No.:	20110147

Scheduled Payment Date per Phase	Start Date per Phase	Phase	Pollutant	Required Reductions (tons)	Project Reductions (tons)
Clean Fleet	11/1/2011	1	NOx	0.0000	0.0000
			PM10	0.0000	0.0000
Clean Fleet	1/1/2012	2	NOx	0.0000	0.0000
			PM10	0.0000	0.0000
Clean Fleet	1/1/2013	3	NOx	0.0000	0.0000
			PM10	0.0000	0.0000
		4	NOx	0.0000	0.0000
			PM10	0.0000	0.0000
		5	NOx	0.0000	0.0000
			PM10	0.0000	0.0000
		6	NOx	0.0000	0.0000
			PM10	0.0000	0.0000
		7	NOx	0.0000	0.0000
			PM10	0.0000	0.0000
		8	NOx	0.0000	0.0000
			PM10	0.0000	0.0000
		9	NOx	0.0000	0.0000
			PM10	0.0000	0.0000
		10	NOx	0.0000	0.0000
			PM10	0.0000	0.0000
TOTAL (tons)			NOx	0.0000	0.0000
			PM10	0.0000	0.0000

NO FDS
2011
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000

FEE DEFERRAL SCHEDULE (FDS) BY PAYMENT YEAR							
2011	2012	2013	2014	2015	2016	2017	2018
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Rule 9510 Fee Schedule ($/ton)		
Year	NOx	PM10
2011 and beyond	$9,350	$9,011

Offsite Fee by Pollutant by Year ($)	NOx	$0
	PM10	$0
Administrative Fee by Year ($)		$0.00
Offsite Mitigation Fee by Year ($)		$0.00
Total Project Offsite Fee ($)		$0.00

$0	$0	$0	$0	$0	$0	$0	$0
$0	$0	$0	$0	$0	$0	$0	$0
$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
$0.00							

Summary		Without Fee Deferral Schedule (A)	With Fee Deferral Schedule (B)	Amount Saved Through One-Time Payment (B-A)
Total Offsite Mitigation Fee by Pollutant ($)	NOx	$0	$0	$0
	PM10	$0	$0	$0
Total Administrative Fee ($)		$0.00	$0.00	$0.00
Total ($)		$0.00	$0.00	$0.00

Total Amount Saved Through On-Site Mitigation Measures	
NOx	$60,962
PM10	$8,515
Total Savings ($)	$69,477

(A) If you have chosen a **ONE-TIME** payment for the project, then the total amount due for ALL PHASES combined is: $0.00

(B) If you have chosen a **DEFERRED** payment schedule for the project, then according to the above Fee Deferral Schedule, the total amount due for ALL PHASES combined is: $0.00

Note: If the District did not receive a request for a Fee Deferral Schedule, an invoice is issued according to the **one-time** payment option.

Indirect Source Review
Complete Project Summary Sheet & Monitoring and Reporting Schedule

Project Name:	SAN JOAQUIN CROSS VALLEY LOOP TRANSMISSION PROJECT
Applicant Name:	SOUTHERN CALIFORNIA EDISON
Project Location:	NORTHWESTERN TULARE COUNTY COUNTY ROAD 148, SR 198, SR 216 APN(s): VARIOUS APNS
Project Description:	LAND USE: Transportation - 23 Miles - New Road Transportation - 23 Miles - New Road Transportation - 23 Miles - New Road ACREAGE: 184
ISR Project ID Number:	C-20110147
Applicant ID Number:	C-301650
Permitting Public Agency:	
Public Agency Permit No.	

Existing Emission Reduction Measures

Enforcing Agency	Measure	Quantification	Notes

There are no Existing Measures for this project.

Non-District Enforced Emission Reduction Measures

Enforcing Agency	Measure	Specific Implementation	Source Of Requirements

There are no Non-District Enforced Measures for this project.

District Enforced Emission Reduction Measures

Enforcing Agency	Measure	Specific Implementation	Measure For Compliance	District Review
SJVAPCD	Construction - Detailed Fleet	For each project phase, maintain records of total hours of operation for all construction equipment, greater than 50 horsepower, operated on site. Within 30-days of completing construction of each project phase, submit to the District a summary report of total hours of operation, by equipment type and horsepower.	(Compliance Dept. Review)	Ongoing
SJVAPCD	Construction and Operational Dates	For each project phase, maintain records of (1) the construction start and end dates and (2) the date of issuance of the first certificate of occupancy, if applicable.	(Compliance Dept. Review)	Ongoing

Indirect Source Review
Complete Project Summary Sheet & Monitoring and Reporting Schedule

(District Enforced Emission Reduction Measures Continued)

Enforcing Agency	Measure	Specific Implementation	Measure For Compliance	District Review
SJVAPCD	Construction and Operation - Recordkeeping	For each project phase, all records shall be maintained on site during construction and for a period of ten years following either the end of construction or the issuance of the first certificate of occupancy, whichever is later. Records shall be made available for District inspection upon request.	(Compliance Dept. Review)	Ongoing

Number of District Enforced Measures: 3

APPENDIX D

Southern California Edison Cross Valley Line Golden Eagle Mitigation and Monitoring Plan

Southern California Edison
Cross Valley Line
Golden Eagle Mitigation and Monitoring Plan

Draft

Prepared by:
Southern California Edison
1218 South Fifth Avenue
Monrovia, CA 91016

June 2013

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INTRODUCTION

Southern California Edison (SCE) intends to construct the Cross Valley Line to maintain safe and reliable electric service to customers and to serve forecasted electrical demand in the southeastern portion of the San Joaquin Valley. The Cross Valley Line will go through the City of Visalia, but primarily resides within unincorporated Tulare County, and will include construction of a new double circuit 220 kilovolt (kV) transmission line to loop the existing Big Creek 3 Springville 220 kV line into Rector Substation. This new line will extend north from Rector Substation for approximately 11 miles where it will turn and head generally east to connect with the existing Big Creek 3 – Springville 220 kV line (see Figure 1, Cross Valley Line Vicinity Map).

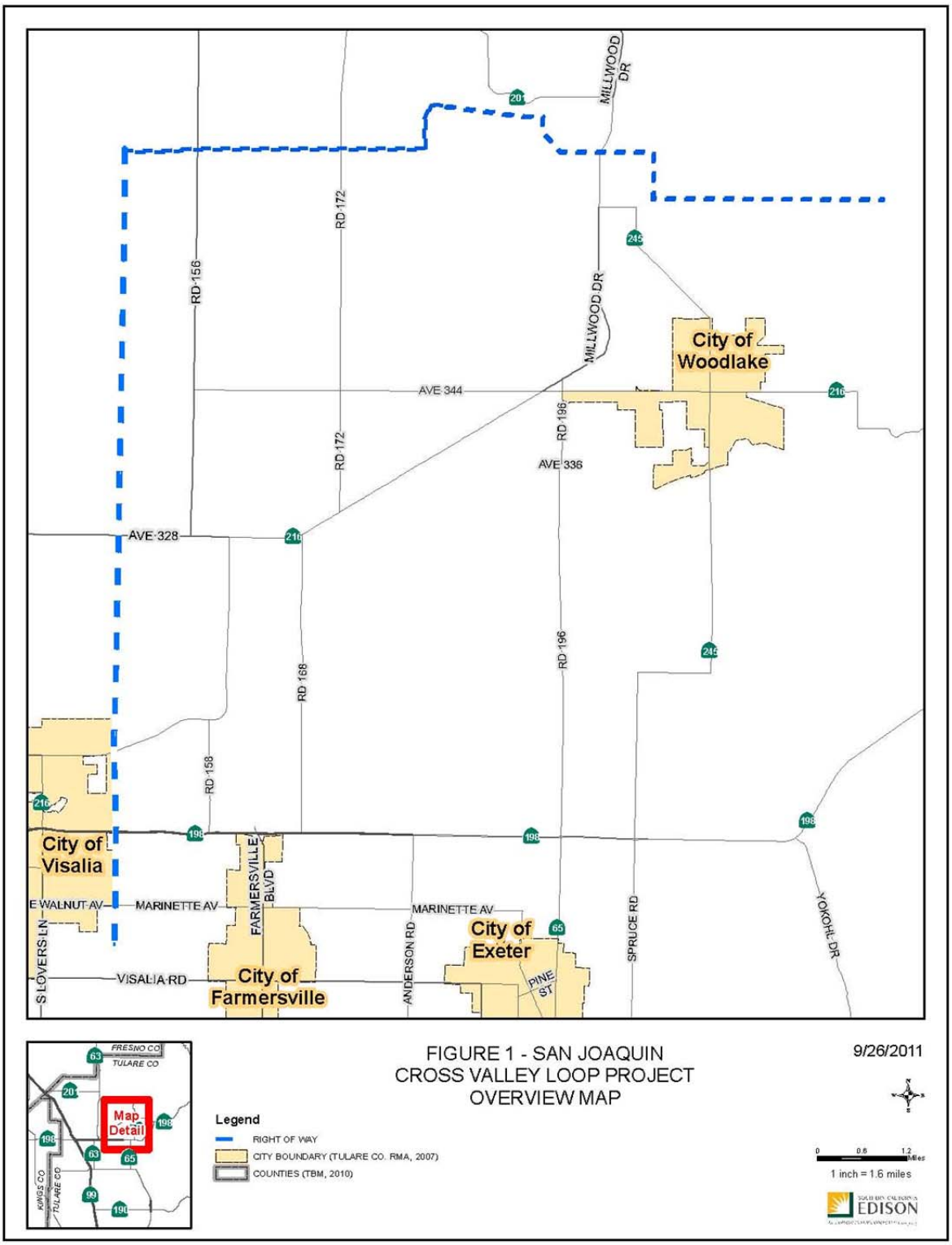
This document describes specific measures that will be implemented and identifies guidance and standards related to structures that are to be followed to prevent injury or mortality to large raptor species, particularly golden eagle (*Aquila chrysaetos*), in addition to other avian species protected by federal or state regulations during construction and operations of this project.

PROJECT DESCRIPTION

Project Purpose and Need

The Cross Valley Line is needed to address the load growth-driven reliability need in Tulare County. Currently, four SCE owned and operated 220 kV transmission lines, commonly referred to as the Big Creek Corridor, move electricity from the Big Creek Hydroelectric Project (Big Creek) to the Electrical Needs Area, which encompasses the Cities of Tulare, Visalia, Hanford, Farmersville, Exeter, and Woodlake, as well as the surrounding areas of Tulare and Kings Counties. Two of the lines begin at Big Creek and terminate at the Rector Substation (Big Creek 1-Rector 220 kV transmission line and Big Creek 3-Rector 220 kV transmission line), whereas the other two lines begin at Big Creek and terminate at the Springville 220/66 kV Substation (Big Creek 3-Springville 220 kV transmission line and Big Creek 4-Springville 220 kV transmission line). In current conditions, if the Rector Substation would be overloaded upon the loss of the Big Creek 1-Rector and the Big Creek 3-Rector 220 kV transmission lines, it could cause a voltage collapse area (NERC/WECC Standard TPL-003). The voltage collapse area would be a geographic area where power is lost for an extended period of time. In the event of a voltage collapse, 300 MW of load will be dropped at Rector Substation affecting approximately 50,000 commercial and residential customers. The new Cross Valley Line will reduce overloads on existing 220 kV transmission lines in the Big Creek Corridor.

Figure 1: Cross Valley Line Vicinity Map



Project History

The San Joaquin Cross Valley Loop Transmission Line Project was filed with the California Public Utilities Commission (CPUC) on May 30, 2008. The application was deemed complete on June 17, 2008. The Draft Environmental Impact Report was published on June 16, 2009 (CPUC 2008) and the Final EIR (EIR) was published on February 24, 2010 (CPUC 2010). The San Joaquin Cross Valley Loop Transmission Project was approved by the CPUC on July 29, 2010, and a Certificate of Public Convenience and Necessity was issued on that date.

The CPUC did not approve SCE's proposed transmission line route, but approved an alternative route known as Alternative 2. Alternative 2 was selected by the CPUC as the Environmentally Superior Alternative because it posed fewer impacts to prime farmland. Subsequent to CPUC approval, engineering design and biological surveys have been conducted in a manner that reduces impacts to special-status biological resources and to support required permitting efforts for this alternative.

The California Environmental Quality Act (CEQA) application for the San Joaquin Cross Valley Loop Project consists of two major components (Big Creek 1-Rector and Big Creek 3-Rector Rebuild and construction of the new Cross Valley Line), which will be built separately and are described in further detail below.

Description of Project Components

The Cross Valley Line begins at SCE's Rector Substation, located in eastern Visalia, and continues north along existing SCE right-of-way (ROW) for approximately 10.8 miles. From mile 10.8 north of Rector Substation, the corridor continues east approximately 12.2 miles along new ROW to be acquired, then north, and eventually winds along the base of Lone Oak Mountain to loop into the existing Big Creek 3-Springville 220 kV transmission line (Figure 1). As discussed above, the San Joaquin Cross Valley Loop Transmission Line Project consists of two major components; however, only the Cross Valley Line portion has the potential to impact Golden Eagles, therefore this plan will only be applicable to the Cross Valley Line component.

The Cross Valley Line entails construction of an approximately 23.3 mile long, new double circuit 220 kV transmission line that would loop the existing Big Creek 3-Springville 220 kV transmission line into the 220 kV Rector Substation creating the new Big Creek 3-Rector No. 2 220 kV and Rector-Springville 220kV transmission line circuits. The Cross Valley Loop Line begins at the Rector Substation and heads due north, following the eastern side of the existing SCE ROW for approximately 10.8 miles. At mile 10.8, the alignment runs east for 3.5 miles to mile 14.3. From mile 14.3 to mile 15.0, the alignment turns north to parallel Road 176 to Avenue 376. The alignment then proceeds east, paralleling Avenue 376 and then southeast through a saddle along the base of Colvin Mountain to Road 194. From mile 17.3 to 17.9 the alignment extends south and then southeast to Road 196. From there, the alignment continues east approximately 1.2 miles and then south 0.6 miles. At mile 19.7, the alignment turns east along the base of Lone Oak Mountain until it reaches the existing Big Creek 3-Springville 220 kV transmission line at a point approximately 52 miles south of Big Creek Powerhouse No. 3. This component also includes access road modification and construction;

installation of optical ground wire (OPGW) for telecommunication and as a shield wire; and grounding and replacement of structures along the Big Creek 3-Springville 220 kV transmission line immediately north and south of the easternmost portion of the Cross Valley Line where it connects with the Big Creek 3-Springville 220 kV transmission line.

Site Preparation

The Cross Valley Line will require the following construction setup areas to be cleared: new road construction and any road improvements; structure work areas for each new structure; pulling/tensioning sites; and installation of temporary structures (such as guard structures) to support construction. The Cross Valley Line will involve the construction of approximately 90 new tubular steel poles and 16 new lattice steel towers; and the removal of two existing lattice steel towers along the Big Creek 3-Springville transmission line.

Site Cleanup

SCE would restore all areas that were temporarily disturbed by project activities, including temporary access routes, material staging yards, pulling, tensioning, and splicing sites, tower removal sites, and construction areas following the completion of construction activities.

Operation and Maintenance

After construction is complete, the transmission line will require regular operation and maintenance activities including: aerial inspections and/or routine patrol; insulator washing; cross arm and insulator repair and replacement; conductor restringing, repair, and replacement; inspection and testing of communication lines; pole and tower repair and replacement; anchor/guy wire installation and replacement; road maintenance; stormwater diversion devices; vegetation management; ROW management; and telecommunication line repair and replacement. Additionally , SCE conducts a wide variety of emergency repairs in response to emergency situations such as, but not limited to: natural disasters (e.g., high winds, storms, wildfires, and earthquakes); natural conditions (e.g., fog, lightning strikes, and animal contamination); and other third party events that effect public health and safety (e.g., vehicle and equipment hit facilities, aerial events involving aircrafts or gliders, general human caused activity, gunshot, theft, and vandalism). This list is meant to provide examples of emergency scenarios that could occur and is no way inclusive.

EIR MITIGATION MEASURES FOR RAPTORS

The Cross Valley Line is required to comply with the Mitigation Measures (MMs) identified in the Mitigation Monitoring, Reporting, and Compliance Program (MMRCP) provided within the San Joaquin Cross Valley Loop Project's EIR (CPUC 2008). The MMRCP addresses four mitigation measures specific to raptors provided below.

Mitigation Measure 4.4-3: SCE and/or its contractors shall implement the following measures:

- Whenever feasible, construction near recently active nest sites shall start outside the active nesting season. The nesting period for golden eagle is generally between March 1 and August 15.

- If construction activities begin during the nesting period, a qualified biologist shall perform a preconstruction survey 14 to 30 days before the start of each new construction phase to search for golden eagle and Swainson's hawk nest sites within one-half mile of proposed activities. If active nests are not identified, no further action is required and construction may proceed. If active nests are identified, the avoidance guidelines identified below shall be implemented.

- For golden eagle, construction contractors shall observe CDFG avoidance guidelines, which stipulate a minimum 500-foot buffer zone around active golden eagle nests. Buffer zones shall remain until young have fledged. For activities conducted with agency approval within this buffer zone, a qualified biologist shall monitor construction activities and the eagle nest(s) to monitor eagle reactions to activities. If activities are deemed to have a negative effect on nesting eagles, the biologist shall immediately inform the construction manager that work should be halted, and CDFG will be consulted. The resource agencies do not issue take authorization for this species.

- If construction begins during the Swainson's hawk nesting period, a qualified biologist shall conduct preconstruction surveys at least 14 days prior to construction following CDFG guidance in areas that potentially provide nesting opportunities to verify species presence or absence. If the survey indicates presence of nesting Swainson's hawks within a half-mile radius, the results shall be coordinated with CDFG to develop and implement suitable avoidance measures that include construction buffers (e.g., 500 feet) and nest monitoring during construction

- Consistent with the Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California, mitigation shall include the following approach:

- No intensive new disturbances or other project-related activities that could cause nest abandonment or forced fledging shall be initiated within a quarter mile (buffer zone) of an active nest between March 15 and September 15.

- Nest trees shall not be removed unless no feasible avoidance exists. If a nest tree must be removed, SCE shall obtain a management authorization (including conditions to offset the loss of the nest tree) from CDFG. The tree removal period specified in the management authorization is generally between October 1 and February 1.

- Monitoring of the nest by a qualified biologist may be required if the project-related activity has potential to adversely impact the nest.

- CDFG often allows construction activities that are initiated outside the nesting season to continue without stopping even if raptors such as golden eagles choose to nest within 500 feet of work activities. Thus, work may continue without delay if surveys verify the local absence of nesting golden eagles, or if construction begins outside the nesting period (August 16 through February 28).

- Following construction, SCE and/or its contractors shall survey for and monitor golden eagle nesting sites in the area to ensure that maintenance activities do not disrupt nest sites. Surveys will be performed at the beginning of the nesting season and continue through the nesting season. Consistent with present policy, disruptive maintenance activities will be suspended within 500 feet of active eagle nests until the young eagles have fledged.

MM BIO 4.4-4: SCE and/or its contractors shall implement the following measures to avoid impacts on nesting raptors and other protected birds for activities that are scheduled during the breeding season (February 1 through August 31):

- No more than two weeks before construction within each new construction area, a qualified wildlife biologist shall conduct preconstruction surveys of all potential nesting habitats within 500 feet of construction sites where access is available.

- If active nests are not identified, no further action is necessary.

- If active nests are identified during preconstruction surveys, a no-disturbance buffer shall be created around active raptor nests and nests of other special-status birds during the breeding season, or until it is determined that all young have fledged. Typical buffers are 500 feet for raptors and 250 feet for other nesting birds (e.g., waterfowl, and passerine birds). The size of these buffer zones and types of construction activities that are allowed in these areas could be further modified during construction in coordination with CDFG and shall be based on existing noise and disturbance levels in the project area.

MM BIO 4.4-5: SCE and/or its contractors shall conduct preconstruction surveys and implement measures to avoid impacts to burrowing owls:

- A qualified biologist shall conduct preconstruction surveys for burrowing owls 14 to 30 days prior to the start of each new construction phase, using the most current CDFG protocol. Surveys shall cover grassland areas within a 500-foot buffer from all project construction sites within suitable grasslands habitat, checking for adult and juvenile burrowing owls and owl nests. If owls are detected during surveys occupied burrows shall not be disturbed.

- Construction exclusion areas (e.g., orange exclusion fence or signage) shall be established around occupied burrows, where no disturbance shall be allowed. During the nonbreeding season (September 1 through January 31), the exclusion zone shall extend 160 feet around occupied burrows. During the breeding season (February 1 through August 31), excludiong areas shall extend 250 feet around occupied burrows.

- If the above requirements cannot be met, passive relocation of onsite owls may be implemented as an alternative, but only during the nonbreeding season and only with prior CDFG approval. Passive relocation shall be accomplished by installing one-way doors on the entrances of burrows located within 160 feet of the project area. The one-way doors shall be left in place for 48 hours. The burrows

shall then be excavated with a qualified biologist present. Construction shall not proceed until the project area is deemed free of owls.

Mitigation Measure 4.4-7: SCE shall follow Avian Power Line Interaction Committee guidelines for avian protection on powerlines. SCE shall use current guidelines to reduce bird mortality from interactions with powerlines. The Avian Power Line Interaction Committee (APLIC, 2006) and USFWS recommend the following:

- Provide 60-inch minimum horizontal separation between energized conductors or energized conductors and grounded hardware;
- Insulate hardware or conductors against simultaneous contact if adequate spacing is not possible;
- Use pole designs that minimize impacts to birds, and;
- In areas with high avian collision risk, shield wires to minimize the effects from bird collisions consistent with APLIC guidelines.

BASELINE INFORMATION

The Cross Valley Loop Project involves the construction of a new approximately 23.3 mile long double-circuit 220 kV transmission line that will reside within existing and new ROW. The approximate 11.3 mile north-south portion of the Cross Valley Line and the westernmost 4.2 miles of the east–west corridor, from its western terminus to the Friant-Kern Canal, generally does not contain natural vegetation suitable to support golden eagles because it has been converted to urban and intensive agricultural production. Common crops occurring within this area include citrus, grapes, and various row crops. The easternmost 8 mile remainder of the transmission line route, areas east of Friant-Kern Canal, supports large tracts of relatively natural habitats. The most common natural community within this area is non-native annual grassland interspersed with isolated rock outcroppings, a matrix of ephemeral pool habitats and other aquatic features (e.g., swales, cattle ponds), Valley and interior live oak woodlands, riparian habitats, and other vegetative communities (Quad Knopf 2010). Therefore, as mentioned previously, the easternmost 8 miles of the new Cross Valley Line is the only portion of the San Joaquin Cross Valley Loop Project that has any potential to support golden eagles.

Bloom Biological, Inc. (2011) conducted golden eagle surveys and Quad Knopf (2012) conducted general raptor surveys for the Cross Valley Loop Project. The California Natural Diversity Database (CNDDB) was queried for historical records of Swainson's hawk, burrowing owl, bald eagle, golden eagle, and California condor occurrences within five miles of the transmission line route. No historical records of the golden eagle are listed within 5 miles of the Cross Valley Line. The nearest historic occurrence (EOID 70201) is located approximately 27.6 miles southeast of the boundary area. A wintering adult was observed foraging in October 2004 approximately 1.2 miles south–southeast of the intersection of Salem Avenue and the Tulare County boundary. However, the nearest breeding occurrence (EOID 13103) is located approximately 32.8 miles north of the route. This nest was observed in May of 1983 on a rock outcrop near the headwaters of Black Rock Creek. There are five historical records of the

burrowing owl listed within five miles of the transmission line route. The nearest occurrence is located approximately 1.4 mile north of the route. No records of other species occur. The United States Fish and Wildlife Service (USFWS) Critical Habitat Portal was queried for Critical Habitat units designated for raptor species within Tulare County. No Critical Habitat for any raptor species is located within five miles of the transmission line route, but Critical Habitat for the California Condor located approximately 5.1 miles south of the route's east terminus.

Additionally, Quad Knopf conducted preliminary evaluations for bird collision risks for the Cross Valley Loop Project. These evaluations were conducted to analyze areas with high avian collision risk in order to determine areas to be marked to maintain compliance with EIR MM4.4-7 and are discussed in greater detail below (see Project Design Features).

Golden Eagle Surveys

Bloom Biological, Inc. conducted golden eagle surveys for the Cross Valley Loop Project during the spring of 2011 and 2013. A four-mile buffer radius around the Cross Valley Line corridor was surveyed based on consultation with USFWS and California Department of Fish and Wildlife (CDFW); and in accordance with the USFWS Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols; and Other Recommendations in Support of Golden Eagle Management and Permit Issuance (Pagel et al. 2010).

A total of four active golden eagle nests were identified within the four mile survey buffer in 2011. Additionally, one active golden eagle (*Aquila chrysaetos*) and two active bald eagle (*Haliaeetus leucocephalus*) nests were identified outside the four mile survey buffer during the bald and golden eagle surveys conducted in 2011 (Bloom Biological 2011). All of the eagle nests were identified east of the Friant-Kern Canal mostly within oak trees (*Quercus* sp.). Only one golden eagle nest was observed within a sycamore tree (*Platanus* sp.). The golden eagle nest identified outside of the four mile buffer was the only eagle nest identified to fail in 2011, all of the other eagle nests observed in 2011 fledged young. Only one of the golden eagle nests identified in 2011 was observed within one mile of the Cross Valley Line. This nest is visibly obstructed from construction areas by a large hill. SCE has consulted with both CDFG and USFWS and received approval to maintain a one-half mile avoidance buffer from this nest during construction.

During the surveys in 2013, eight golden eagle nests were identified within four miles of the proposed Cross Valley Line; all of the nests were found east of the Friant-Kern Canal mostly within oak trees, on cliffs and one on a utility pole. Only two of these eight nests were active in 2013; one active nest was located within an oak tree (*Quercus* sp.) about 1.0 mile from the line and contained three young; the other nest located on the cliff about 0.9 miles from the line was active (incubation stage) during the first survey but then it failed for unknown reasons. The nest nearest to the project, located in an oak tree within 0.4 miles from Cross valley Line that was active in 2011 was found inactive in 2013. In fact, three of the five nests reported in 2011 survey report (Bloom Biological 2011) were inactive in 2013 (Bloom Biological 2013). Additionally, three

new nests identified in 2013 within 3.1, 1.2 and 2.3 miles from Cross Valley Line and not recorded in 2011 were inactive.

General Raptor Surveys

Quad Knopf conducted a reconnaissance survey during the Spring of 2010 to provide preliminary data on the potential for breeding raptors to occur within the raptor survey area (a one mile buffer around the 1,000 foot transmission line study corridor). Additionally, a focused raptor surveys were conducted by Quad Knopf during the breeding season of 2011 and 2012 to map the locations of breeding raptors within the raptor survey area. Each observed nest was then monitored monthly throughout the majority of the 2011 and 2012 breeding seasons (March through July) (Quad Knopf 2012 and 2013). The surveys included protocol and focused surveys for a number of protected raptor species, including Swainson's hawk and burrowing owl, with the potential to occur within the Cross Valley Loop Project area. Though no formal protocols have been produced by federal or state agencies to guide presence/absence surveys for the California condor, field surveys to record observations of California condors were conducted concurrently with the general raptor survey, as well as during the bald and golden eagle surveys mentioned above.

A total of 64 raptor nests were identified during the 2011 and 2012 general raptor nest surveys of which 42 nests were located within the one mile wide survey area. Eight of the total 64 nests were identified during the 2012 general raptor surveys. Twenty-one nests located during the 2011 general raptor surveys were no longer present in 2012. Additionally, five nests were not accessible during any of the 2012 surveys and two were not accessible for one or more of the 2012 surveys due to landowners limiting access to these areas. A total of 38 nests were monitored during the 2012 general raptor surveys including, 36 nests monitored for the entirety of the 2012 general raptor survey and an additional 2 nests monitored for part of the 2012 general raptor survey. Of the 38 nest monitored in 2012, 23 nests (61%) were active and 15 nests (39%) were inactive. The active nests included 15 red-tailed hawk nests, two great horned owl nests, one American kestrel nest, one golden eagle nest, and four red-shouldered hawk nests. Nests were predominantly found within three tree species; eucalyptus (*Eucalyptus* sp.), Valley oak (*Quercus lobata*), and interior live oak (*Quercus wislizeni*). Fifty-five percent (21) of the nests were located east of the Friant-Kern Canal, an area that encompasses approximately 8.0 miles (34%) of the alignment.

No Swainson's hawk nests were identified during the 2011 or 2012 Swainson's hawk surveys. Swainson's hawk protocol-level surveys will be conducted until the start of construction activities in accordance with CDFW consultation and recommendations.

A total of four burrowing owl adults were identified within the Cross Valley Loop 1,000 foot-wide study corridor during the 2011 surveys. All of the sightings were east of the Friant-Kern Canal. One of the adults identified within the study corridor was associated with an active burrow, determined by the presence of owl cast pellets and prey remains near the burrow entrance. A second active burrow was identified less than 350 feet to the south, but no burrowing owl was observed near its entrance. Neither of these two burrows was intact during subsequent visits due to cattle activity in the area. The third adult was sighted just east of the Friant-Kern canal. The forth burrowing owl was identified near the

east terminus of the study corridor and appeared to be a transient forager, as it was not associated with any active burrow. Four burrowing owls were located east of the Friant-Kern canal outside of the 1,000 foot-wide study corridor. All of the sightings were east of the Friant-Kern Canal. Burrowing owls are addressed specifically within the Burrowing Owl Management Plan (Appendix G to the Nesting Bird Management Plan).

No California condors or California condor nests were identified during either the general raptor or bald and golden eagle surveys that were conducted. Landscapes deemed most suitable for California condors are generally located well east of the study corridor within the foothills and mountains of the Sierra Nevada Mountain Range. No potential breeding habitats for California condors were identified within the vicinity of the study corridor. One California condor that is tracked by the USFWS was recorded approximately 1.4 miles north of the transmission line on May 1, 2011. This was likely a temporary stopover that occurred while the condor was foraging in the region. Two other California condors have been documented within 15.0 miles of the transmission line. All three of these condors were likely engaged in exploratory or dispersal flights, and had yet to establish a permanent home range or nesting and roosting site(s).

PROJECT DESIGN FEATURES

Although transmission lines present a collision risk for some bird species, studies have found that raptors, which are good fliers and quite agile, are much less likely to collide with power lines and are generally not at high risk for collisions (Bevanger 1999; Janss 2000; Erickson et al. 2005). For example, Bevanger (1998) reviewed 16 investigations of bird collisions with power lines and found waterfowl and shorebirds to comprise the majority of collisions. Accipitridae (hawks, eagles, vultures) accounted for 7 individuals out of a total of 12,226, or 0.05%. Of this very small percentage, no distinction was made in the study between transmission lines and distribution lines, nor between types of accipitridae. Review of utility mortality data in California, Oregon, Idaho, Wyoming, Montana, and Utah also indicates low collision rates of golden eagles with transmission lines. The data shows only one documented eagle collision on a PacifiCorp 230kV transmission line and no eagle electrocutions on any transmission lines at or above 220kV for other western utilities. Based upon available studies, very few eagle mortalities were attributed to electrocution from, or collisions with, transmission lines of 220kV or above.

As required by Mitigation Measure 4.4-7 in the MMRCP of the Cross Valley Loop Project EIR, SCE is required to mark areas of the shield wire determined to have high avian collision risk consistent with Avian Power Line Interaction Committee (APLIC) guidelines to minimize the effects from bird collisions. Bird collision risk is of greatest concern during periods of low visibility, such as periods of valley fog. Bird collision data was collected for the Cross Valley Loop Project in 2010 by Quad Knopf consistent with APLIC recommendations. Theses evaluations were conducted to determine areas with potential for high avian collision risk. The bird collision evaluation gathered information on the presence of water birds, bird behavior, flight path, land use, disturbances, topography, and location of the transmission line relative to water features (Quad Knopf 2011). This information was assessed to determine where the OPGW should be marked with line marking devices in order to reduce collision risk by making the line more visible in accordance with APLIC recommendations (APLIC 2012). A plan was devised to make the

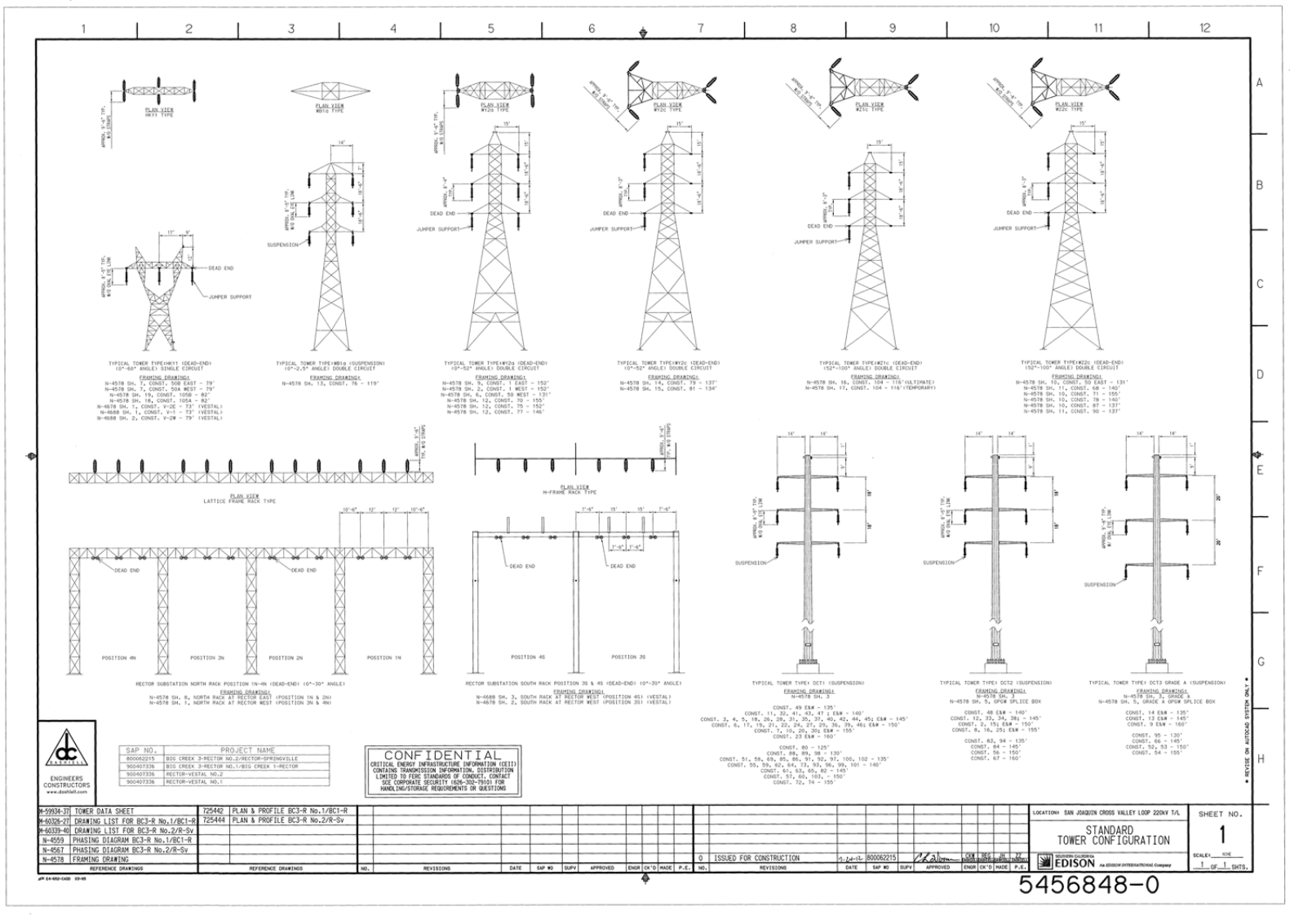
line more visible to water birds by installing line marking devices along portions of the OPGW identified to have a high potential for collision risk.

Additionally, SCE personnel met with Jesse Grantham, condor expert with USFWS, on November 3, 2011 to discuss suitable avoidance and minimization measures to reduce any potential impacts to condors. Based on this meeting, line marking devices will be installed on the shield wire (OPGW) along the easternmost 3.25 mile portion of the Cross Valley Loop transmission line, east of Friant-Kern Canal, to aid in making the lines more visible to condors and to reduce the potential for condors to collide with the line. This portion of the line provides potential foraging habitat for condors. Marking of this line for condors will further reduce any potential for golden eagles to collide with the line.

As required by Mitigation Measure 4.4-7 in the Cross Valley Loop EIR, the transmission lines for the Project will be designed to avoid electrocution of avian species by following Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006 (APLIC 2006). SCE will follow APLIC guidance regarding minimum recommended clearance separation between phase conductors or between phase conductors and grounded hardware. These clearances are based on the size—specifically, the wrist-to-wrist measurement—of a golden eagle. The potential for electrocution on transmission lines, such as the Cross Valley Line, is very low because the design for transmission lines with voltages of 220 kV and above requires greater separation distance between conductors and between conductors and ground than what is typically recommended by the APLIC guidance (see Figures 2).

Based on the best biological information available regarding eagle and raptor mortalities, SCE's design and implementation of the Mitigation Measures in the EIR will ensure that the take of golden eagles and other raptors is unlikely to occur. In addition, the Project's design and mitigation measures will address impacts to other bird species known to occur within the Project area. The Project is designed to prevent electrocution of eagles, as well as the electrocution of other protected bird species, many of which are smaller than the golden eagle. Implementation of the mitigation measures in the EIR and Nesting Bird Management Plan will prevent the take of protected birds and their nests through preconstruction surveys and biological monitors as well as incorporation of species specific buffers.

Figure 2: Standard Tower Configuration



MITIGATION AND CONSERVATION MEASURES

As demonstrated by the lack of recorded mortality in the area around the existing transmission line, the risk of golden eagle take is very low. However, the following mitigation measures set forth in the Mitigation Monitoring, Reporting, and Compliance Program (MMRCP) of the San Joaquin Cross Valley Loop EIR, as well as within this Golden Eagle Mitigation and Monitoring Plan (GEMMP) are intended to assure a net zero loss of golden eagle and will reduce impacts to other important and/or protected large raptor species to below a significant level.

GEMMP Conservation Measures

Golden Eagle Active Nest Buffer

To prevent impacts to nesting golden eagles by construction activities, SCE will try to coordinate construction activities to occur outside of the golden eagle nesting season (March 1 and August 15) within areas potentially suitable to support nesting golden eagles. If construction activities must occur during the nesting season in areas with potential to support nesting golden eagles, SCE will not conduct construction activities within 1 mile of an active golden eagle nest or 0.5 miles of an active golden eagle nest if the nest is not within direct line of sight of construction activities, unless it has been determined a nest is not active that year or based on agency consultation.

Golden Eagle Nest Monitoring

<u>During Construction</u>

To prevent disturbance to active golden eagle nests, a qualified biologist will monitor all eagle nests (even if previously occupied by a different species) for new eagle activity prior to and during construction within one mile of the project area.

If an active eagle nest is discovered, construction within 1 mile of the nest or 0.5 miles if the nest is not within direct line of sight of construction activities, will be postponed until the nest has fledged/failed. To reduce eagle stress due to human disturbance, ground monitoring will only be conducted minimally (approx. once per week) near active eagle nests.

<u>Post Construction</u>

In an effort to evaluate longer term impacts of the Project on nesting golden eagles, SCE will continue to perform golden eagle nest surveys post construction using the same methodology as the previously conducted golden eagle nest surveys in accordance with the USFWS Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols; and Other Recommendations in Support of Golden Eagle Management and Permit Issuance (Pagel et al. 2010). These post construction surveys will be conducted for an additional 3 years. Results will be reported to USFWS on an annual basis.

Nesting Bird Management Plan

The Nesting Bird Management Plan, details survey requirements and protocols, indicates appropriate nest buffers for different species and species groups, and reporting requirements. This plan was developed in cooperation with CDFG and USFWS, to outline SCE's strategy to minimize disturbance and avoid impacts to nesting birds from construction activities. This Plan provides a framework for managing nests in and around the Cross Valley Line construction areas in a manner to avoid take of active nests during construction.

Avian Reporting System

SCE has an internal procedure for avian mortalities and nest issues. Patrolmen and Troublemen responsible for patrolling the lines and investigating interruptions on the system report mortality and nests using the Wildlife Mortality/Bird Nesting Report. An annual report is submitted to USFWS in compliance with SCE's Special Purpose Permit.

As part of the Nesting Bird Management Plan for the Project, biological monitoring reports will be generated regularly during the construction phase of the Project. All avian data collected for the daily reporting will be input from the field on hard copy paper forms or mobile smartphones using an offline form, and then entered/uploaded online into the database and submitted monthly to CPUC, CDFW, and USFWS. A nesting bird table, updated monthly for submittal to the CPUC, USFWS, and CDFW, will show the current status of all active nests within the construction areas (if any), distances of disturbance-free buffers that have been implemented to avoid nest failures, proximity to active construction activities, and estimated fledge date.

Line Markers

Based on informal consultation with USFWS concerning California condors, bird flight diverters will be placed on portions of the OPGW, which is the top wire, to make the shield wire more visible in the eastern portion of the Cross Valley Line. These bird flight diverters will be installed to reduce condor collision risk with the line; however, these markers will also aid in reducing the chance of golden eagles colliding with the line. Additionally, evaluations of the Cross Valley Line corridor were conducted in accordance with APLIC guidelines to identify areas with high avian collision risk (Quad Knopf 2011). These evaluations identified eight locations along the Cross Valley Line corridor with high avian collision risk. These areas will be marked in order to reduce the risk of avian collision, as required by MM 4.4-7 (Quad Knopf 2011).

MITIGATION

In the highly unlikely event a golden eagle mortality occurs as a result of this transmission line, SCE will work with the USFWS to identify appropriate mitigation measures to ensure that the net zero loss standard is maintained. Potential mitigation measures available include: (1) placement of visual markers on the transmission line; (2) funding transmission line collision and electrocution studies to help inform future mitigation options; (3) based on results of transmission line collision and electrocution studies,

work with the USFWS to determine how many miles of line should be marked/retrofit to offset eagle mortality; (4) funding the protection and long-term management of additional golden eagle nesting and/or foraging habitat. The mitigation measure selected by SCE to offset golden eagle mortality and ensure continued no net loss of golden eagle populations must receive the concurrence of the USFWS.

RISK ASSESSMENT

As a part of SCE's company-wide APP, which is currently under development, SCE is performing risk assessments on its system as a whole, including the Cross Valley Line area, for both electrocution and collision hazards. The purpose of these risk assessments will be to identify the highest risk areas within the SCE system and focus retrofit efforts in these areas. Because this Project is not expected to have a high risk of either electrocution or collision due to project design, a project-specific risk assessment will not be performed. However, SCE will conduct the mortality study detailed above to gather additional data on electrocution and collision risks.

CONCLUSION

Electrocution and collisions of golden eagles as the result of implementing this Project are highly unlikely, and this issue will be addressed through mitigation measures, such as those described above, in the very unlikely event the Project causes the take of an eagle. This Project-specific GEMMP developed by SCE focuses on identifying golden eagle and other raptor territories and determining activity status. Appropriate buffers and coordination with the Wildlife Agencies will ensure the Project does not impact nesting success.

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